

ATTACHMENT J-1
STATEMENT OF NEED



GOES

Data Collection System (DCS)

Automated Processing System (DAPS) II



TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	J-1
1.1 BACKGROUND	J-1
1.2 DAPS II OVERVIEW	J-1
1.3 DOCUMENT ORGANIZATION	J-2
1.4 SCOPE	J-2
1.5 APPLICABILITY AND ACCURACY OF DOCUMENTATION	J-2
2.0 DAPS II DETAILED REQUIREMENTS	J-4
2.1 SYSTEM PERFORMANCE REQUIREMENTS	J-4
2.1.1 Combined Input Data Rate	J-5
2.1.2 DAPS II Daily Message Storage Requirements.	J-5
2.1.3 DAPS II Response Time Requirements	J-6
2.2 RELIABILITY	J-7
2.2.1 DAPS II Availability	J-7
2.2.2 DCS Failures	J-7
2.2.3 DCP Failures	J-8
2.2.4 Failure Recovery	J-8
2.2.5 DAPS II Redundant Systems Switching	J-8
2.3 OPERABILITY	J-8
2.3.1 DAPS II Operations	J-9
2.3.2 DAPS II Monitoring	J-9
2.3.3 DAPS II System Configuration.	J-9
2.3.4 DAPS II Access Control	J-9
2.3.5 DAPS II Database Access Privileges	J-9
2.4 COMPATIBILITY	J-10
2.4.1 Existing Message Data Format and Header	J-10
2.4.2 Existing DAPS Database Tables	J-10
2.4.3 Existing DCS Interfaces	J-10
2.4.4 Existing User Interfaces	J-10
2.5 REAL TIME DATA PROCESSING	J-11
2.5.1 DAPS II Data Ingest	J-11
2.5.2 DAPS II Scheduling, Control, and Monitoring	J-13
2.5.3 DAPS II Message Data Handling/Processing	J-17
2.5.4 DCS Test Transmitter Requirements	J-19
2.5.5 DCS Transponder Bandpass Adjustment	J-20
2.5.6 DCP Message Data Dissemination	J-21
2.5.7 DOMSAT Data Quality Monitor (DQM)	J-21
2.5.8 DCP Real Time Diagnostics	J-21
2.5.9 DAPS II Realtime Record Keeping.	J-23

	<u>Page</u>
2.6 DAPS II DATABASES	J-26
2.6.1 Database Conversion	J-26
2.6.2 Database Security	J-28
2.6.3 Database Management	J-29
2.7 DAPS II REPORTS	J-30
2.7.1 DAPS II Report Generation	J-30
2.7.2 DAPS II Statistics Charts	J-31
2.7.3 DAPS II Map Generation	J-31
2.8 DAPS II INTERFACES	J-32
2.8.1 DAPS II/DAMS Interface.	J-32
2.8.2 Test Transmitter Interfaces	J-32
2.8.3 Interrogate Modulator Interfaces	J-32
2.8.4 DCS Interrogate Control Equipment (DICE) Monitoring Interface	J-32
2.8.5 DAPS II Intranet Communications	J-33
2.8.6 DAPS II User Data Dissemination Interfaces	J-33
2.8.7 Wallops Timing System Interface	J-34
2.8.8 Channel Interference and Monitoring System (CIMS) Interface	J-34
2.9 GOVERNMENT SYSTEM UTILITIES	J-34
2.9.1 Government DCS Personnel Interface	J-35
2.9.2 Administrative Utilities	J-36
2.9.3 Electronic Mail (email) Utility	J-37
2.9.4 DCP Look Angle Utility	J-38
2.10 DCS USER INTERFACES	J-38
2.10.1 DOMSAT Broadcast Circuit	J-38
2.10.2 NWSTG Dissemination Circuit	J-40
2.10.3 Dial-in Asynchronous Circuits	J-41
2.10.4 Internet Circuit	J-42
2.11 PHYSICAL REQUIREMENTS	J-46
2.11.1 Cabling	J-46
2.11.2 Workstations	J-46
2.11.3 Rack Requirements	J-46
3.0 DOCUMENTATION	J-47
3.1 SYSTEM OPERATIONS AND MAINTENANCE (O&M) MANUALS	J-47
3.2 DAPS II GOVERNMENT DCS PERSONNEL O&M MANUAL	J-47
3.3 DAPS II USER INTERFACE MANUAL	J-47
3.4 COTS MANUALS	J-48
3.5 DAPS II SOFTWARE	J-48
3.5.1 Program Maintenance Manuals	J-48

May 19, 2000

Revision 04

	<u>Page</u>
3.5.2 Database Specifications	J-48
3.5.3 Software Systems Maintenance Manual	J-48
3.6 SOURCE LISTINGS	J-49
4.0 INSTALLATION AND INTEGRATION	J-50
4.1 DAPS II INSTALLATION	J-50
4.2 CABLING	J-50
4.3 TOOLS AND EQUIPMENT	J-50
5.0 ADDITIONAL REQUIREMENTS	J-51
5.1 SPARE PARTS	J-51
5.2 SYSTEM DEVELOPMENT	J-51
5.2.1 Hardware	J-51
5.2.2 Software Development Hardware.	J-51
5.2.3 Software Development.	J-51
5.3 EQUIPMENT COLORS	J-52
5.4 GOVERNMENT FURNISHED EQUIPMENT (GFE)	J-52
GLOSSARY	J-54
LIST OF ACRONYMS	J-59

1.0 INTRODUCTION

1.1 BACKGROUND

The National Environmental Satellite, Data, and Information Service (NESDIS) manages, operates and maintains the U.S. Geostationary Operational Environmental Satellite (GOES) system. The GOES system's primary mission is to continuously observe changing weather phenomena from satellite based sensors situated approximately 23,000 miles from Earth. The GOES program supports an environmental data point-to-point radio relay Data Collection System (DCS). The DCS allows a remote radio set or Data Collection Platform (DCP), which is land, sea or mobile based to transmit through the GOES system and back to the NESDIS Wallops Command and Data Acquisition (CDA) Station at Wallops, Virginia from where this data is selectively routed to the appropriate system users via communications links. System resource management and database administration are conducted at the NESDIS Suitland Federal Center in Suitland, Maryland via workstations connected to the DAPS.

GOES DCS was made operational more than twenty years ago. The realtime data processing system, the DCS Automated Processing System (DAPS), was made operational in 1989. Since 1989 the number of DCP allocations and the number of DCS users has grown considerably. To accommodate this growth, NESDIS has added new equipment, upgraded requirements and modified the DAPS. These changes include, but are not limited to, the following:

- Increased disk storage capacity with standard SCSI interface support
- Improved user access via dial-up circuits and Internet connections
- Interactive Telnet session and File Transfer Protocol (FTP) capability
- Split parallel redundant computer system operation with automated failover
- Additional monitoring of channels for interference problems
- Upgraded computers, operating systems and applications for Y2K compliance
- Replaced interrogate modulators and provided additional capabilities
- Hardware cabling and connection upgrades on demodulator RF system

1.2 DAPS II OVERVIEW

The requirements set forth below establish the statement of need for the DAPS II. The DAPS II shall provide all of the realtime data handling, processing, command, control, monitoring, storage, retrieval and database management functions of the present DAPS. The DAPS II shall provide enhanced system and resource management utilities, flexible database access and search features, and an Internet browser compatible Graphical User Interface (GUI). The primary functions of the DAPS are described in the Operator/Manager Manual and in Section 2 of the User Interface Manual (UIM) which can be reviewed via the DAPS II acquisition web page at <http://www.osd.noaa.gov/daps>.

1.3 DOCUMENT ORGANIZATION

This Statement of Need consists of the following five sections: Section 1 provides an Introduction to DAPS II; Section 2 specifies the DAPS II Detailed Requirements; and Sections 3 through 5 describe Documentation, Installation and Integration, and Additional Requirements, respectively.

1.4 SCOPE

This requirement involves the design and development; in-plant and on-site testing; subsystem installation, integration and phase-in transition; and training and documentation for operation and maintenance of the DAPS II. Design and development focuses upon realtime Data Collection Platform (DCP) message data handling, processing, dissemination, error checking, quality control, accumulating system performance statistics, and providing data storage and retrieval. The DAPS II shall operate continuously with no loss of DCP message data due to any single point failure. Beyond the DCP data, the DAPS II shall include a COTS based Graphical User Interface (GUI) and a Data Base Management System (DBMS). The DBMS shall retain all system records, enable system level reports to be automatically generated, and provide the capability to generate ad hoc queries, charts, graphs, maps, reports, etc. The format and contents of all existing DAPS databases and description tables, such as the Platform Description Table (PDT), User Description Table (UDT), Radio Description Table (RDT), etc. must be converted and incorporated into the DAPS II. DBMS flexibility shall be provided with capability to add and expand database fields, and make automatic updates to the database based on platform message transmissions.

The DAPS II system hardware design shall be performed at the computer systems level. The system components shall be replaceable via vendor upgrade or technology refresh for a projected system lifetime of ten years. Custom hardware development may be required for the synchronous to asynchronous 100 bps demodulator converters. The DAPS II software design shall be suitable for an open, non-proprietary system architecture, based on a combination of high level programming and COTS products. Assembly and firmware coding is permitted as required to support the system realtime processing and hardware interface requirements. If assembly level coding is needed to fulfill realtime requirements, it must be clearly stated. The DAPS II shall be installed, tested, and integrated into the GOES DCS area of the NESDIS Wallops CDA Station (WCDAS), Wallops, Virginia and at the DCS management area in the Suitland Federal Center, Suitland, Maryland.

1.5 APPLICABILITY AND ACCURACY OF DOCUMENTATION

When references are made to the NOAA NESDIS Standards attached in Section J-4, only the applicable portions identified in the reference apply. If no specific reference is identified, then the entire NESDIS standard requirements apply.

May 19, 2000

Revision 04

The statistical reports and interface description requirements included as attachments to this Statement of Need contain certain information based upon the configuration of DAPS at time of delivery. Major DCS modifications that have been implemented are listed in Section 1.1 above; however, the available documentation may not accurately represent the current operational status, since system modifications will continue to occur, such as the addition of High Data Rate (HDR) demodulators and new test transmitters to the DAMS, and improved user access to the DAPS via growing Internet access.

2.0 DAPS II DETAILED REQUIREMENTS

The DAPS II shall fulfill all of the present DAPS requirements and provide considerable performance, user interface, and system utility improvements. The DAPS primary functions are identified in paragraph 2.1 of the User Interface Manual. All new DAPS II requirements are identified below.

The DAPS II shall operate continuously, 24 hour a day, seven days a week. DAPS II shall ingest and demultiplex DCP message data from the 233 channels at one of three data rates; monitor each message for data quality, conformity with schedule, and proper channel assignment; store and disseminate DCP message data; and maintain statistics on all DCP message data transactions. DAPS II shall also retain the central system databases; provide command and control of the interrogate modulators, test transmitters, and the Channel Interference Monitoring System(CIMS); diagnose DCS channel interference and DAPS II component or system failures; and record all events in the DCS. DAPS II shall include a windowing Graphical User Interface (GUI) and utilities for system control, management, administration and reporting support. While many DCS Users will continue to receive their DCP data by way of the leased domestic satellite (DOMSAT) broadcast link or via the National Weather Service Telecommunications Gateway (NWSTG) formerly identified as the NMC circuit, the DAPS II Internet interface will be available to all Government DCS Personnel and DCS Users. For those DCS Users who continue to use the asynchronous dial-in telephone circuits for system access, a GUI similar in appearance and function to the DAPS II Internet connection shall be provided. A text-only version shall be available for backward compatibility to support dial-in users with limited capability.

2.1 SYSTEM PERFORMANCE REQUIREMENTS

The DAPS II shall support up to 100,000 DCPs and up to 10,000 DCS Users. The DAPS II shall input data from the 233 currently configured DCS channels together having a combined data rate of up to 280 kbps with no flow control. Message handling capacity shall be up to one (1) million DCP data messages a day, and up to one (1) Gigabyte of message data per day shall be processed, stored, and disseminated in real time. The DAPS II shall retransmit any data not received correctly by the user, either when automatically detected by the system or requested by Government DCS Personnel or DCS Users. All DCP message data shall be maintained in backup status for at least 30 days, and made available on request.

DAPS II shall support the following internal and external links, concurrently and without degradation to its real-time processing performance:

- Data Acquisition and Monitoring System (DAMS) with 233 channels and 266 demodulators.
- DOMSAT transmit modem for message data dissemination.
- DOMSAT processed message data return stream.
- Data Quality Monitor (DQM) to monitor DOMSAT links and retransmission requests.

- DAPS II message data simulator for testing under system loading conditions.
- Interrogate Modulator (IM) for each GOES spacecraft forward link to platforms.
- Test Transmitter (TT) for monitoring each GOES spacecraft DCS channel quality.
- Channel Interference Monitoring System (CIMS) for detecting channel. interference.
- NWSTG link via dedicated circuit with specially formatted headers for distribution.
- Asynchronous dial-in telco circuits for ten (10) simultaneous interactive users.
- Internet connections for up to five hundred (500) simultaneous interactive users for push and pull access initially, expandable to accommodate all users.
- Two (2) Government operations facilities with communications interfaces, separated geographically by over 150 miles with total of ten (10) workstations.

The DOMSAT interface, NWSTG dedicated circuit, asynchronous dial-in circuits, and Internet service for data dissemination and system utilities access shall be located at the NESDIS facility at Wallops, Virginia. DCS system resource management and database administration shall be performed at the Federal Building-4 (FB-4) Suitland, Maryland via workstations networked to the DAPS II. All external links shall have security access controls such that only authorized Government DCS Personnel and DCS Users may access the system. Individual accounts with user ID and password shall be maintained for each DCS User.

System performance requirements and derivations of the real time message data input and storage assumptions are described below.

2.1.1 Combined Input Data Rate: The existing DAPS input data rate, assuming 233 active 100 bps DAMS demodulators, is $233 \times 100 = 23.3$ kbps rate. With a 200% overhead for multiplexing, the demodulator data stream yields $3 \times 23.3 \approx 70$ kbps rate. The DAPS II shall support a combined input data rate of 280 kbps. This is based on the following assumptions: 50 active 1200 bps demodulators occupying 100 of the 1.5 kHz channels results in a $50 \times 1200 = 60$ kbps rate; 100 active 300 bps demodulators results in a $100 \times 300 = 30$ kbps rate; and 33 active 100 bps international channels results in $33 \times 100 = 3.3$ kbps for a combined total of 93.3 kbps. Assuming an additional 200% overhead for multiplexing this yields $3 \times 93.3 = 280$ kbps.

2.1.2 DAPS II Daily Message Storage Requirements.

The DAPS II shall provide 21 GB of DCP message data storage. This is derived in the table shown below. Given these assumptions a message data handling of $60 \times 24 \times 691 = 995,040$ messages and data storage of $60 \times 24 \times 486 \text{ kB} = 700$ MB of data per day results in a combined 30 day DCP data storage of $30 \times 700 = 21$ GB.

Table of Practical Channel Utilization Assumptions and Daily Message Storage Requirements

DCP Chan. Type	Chan. Rate, bps	Num. of Chan.	Chan. Bwth, kHz	Msg. Min./ Chan.	Data/ Msg., Sec.	Data Msg./ Chan.	Msg. Min., Total	Each Msg., Sec.	Total Data, Bytes	Total Bytes/ Min.
D	100	33	3.0	1	60	1	33	15	188	6188
S	300	50	1.5	1	60	1	50	30	1125	56250
S	300	15	1.5	1	30	2	30	15	563	16875
S	300	15	1.5	1	15	4	60	8	300	18000
R	300	15	1.5	1	10	6	90	5	188	16875
I	300	5	1.5	1	60	1	5	30	1125	5625
S	1200	10	3.0	1	60	1	10	50	7500	75000
S	1200	10	3.0	1	30	2	20	25	3750	75000
S	1200	30	3.0	1	5	12	360	4	600	216k
Totals		233	400				691		15338	486k

2.1.3 DAPS II Response Time Requirements. The DAPS II maximum permissible response times are provided in the table below. The response time depends upon the type and source of the request. The Government DCS Personnel shall have faster responses than DCS Users accessing the system via asynchronous dial-in and/or the Internet interface. The response time assumes that the respective communications link is available. All required response times are given in seconds.

DAPS II - Table of Maximum Response Times

System Task	Government	User
System Displays, Full Screen	2	10
Update Database and Return Control	5	15
Return Page of Database Retrieval	5	10
Return First Message of Message File Retrieval	5	10
Return Subsequent Messages, Message File Retrieval*	2	5
Display Statistical Report as Described in Section J-4**	5/hr	15/hr

* Message retrieval rates cannot exceed the transmission rates of the associated communications lines.

** Number of seconds for each hour of data to be analyzed.

Note that a message file retrieval includes either a DCP address with time interval or a netlist and time interval.

2.2 RELIABILITY

The DAPS II design shall ensure that no single point of failure shall cause a permanent loss of any DCP message data once it is received for processing by the DAPS II.

2.2.1 DAPS II System Availability. After DCP message data has been received and demodulated through the GOES ground segment and the DCS DAMS demodulators at WCDAS, the DAPS II shall provide system availability of at least 99.99%, with no loss of DCP message data. Availability means that the DAPS II shall perform all functions with downtime limited to less than 53 minutes per year.

2.2.2 DCS Failures. DCS failures shall not cause a loss of any DCP data in the DAPS II. The DAPS II shall monitor all DCS equipment and interfaces, all internal peripherals, and all I/O interfaces. In the event of a failure, the DAPS II shall signal an alarm condition, display the possible cause and location of the problem to Government DCS Personnel, and maintain a record of the event. Redundancy shall be used in the DAPS II design where necessary to fulfill this requirement.

- 2.2.3 DCP Failures. The DAPS II shall automatically detect DCP failures, signal an alarm, notify the Government DCS Personnel and the platform owner, and make a record of the event. Possible failures in DCP data used by the current DAPS are included under Abnormal Message Data Responses, paragraph 2.4 of the DAPS User Interface Manual.
- 2.2.4 Failure Recovery. In the event of a failure the DAPS II shall automatically recover in two (2) seconds or less with no loss of DCP message data. The system I/O interfaces shall be restored from any DAPS II failure in less than 30 seconds. Also, all files and databases necessary for system restoration shall be maintained such that an operator can reboot the system within two (2) minutes. The DAPS II Mean Time to Repair (MTTR) shall be five (5) minutes assuming a Lowest Replaceable Unit (LRU) replacement is with the spare parts available on-site. In the event of such failure, all data shall continue to be available and data received during the outage shall be transmitted. It shall be noted that under no operating condition should loss of DCP message data result.
- 2.2.5 DAPS II Redundant Systems Switching. Redundant systems designs may be used to satisfy these requirements. The DAPS II shall control all logical and physical switching required to transfer control, operation, data, I/O interfaces and communication links among any redundant components, if used. Operator override procedures shall be available to perform any switching in the event of automatic switching component failure. If redundant system databases are used then they must be synchronized to prevent any loss of message data during system switching.

2.3 OPERABILITY

The DAPS II shall be designed to support a continuous real time mission, 24 hours per day, seven days per week. DAPS II system components shall be installed in two (2) NOAA facilities located as follows:

1. Wallops Command and Data Acquisition Station (WCDAS) at Wallops, Virginia.
2. Office of Satellite Data Processing and Distribution (OSDPD) in the Suitland Federal Center, Federal Office Building #4 (FOB-4), Suitland, Maryland.

DAPS II shall perform all real time operations without manual intervention, but Government DCS personnel will be present to respond to alarm conditions, such as failure indications on the DAPS II system components, user-owned DCPs, data dissemination interfaces, or the GOES space/ground segment monitored at the WCDAS. Required alarm conditions are listed throughout this section in the context of the requirements for the associated hardware or software.

2.3.1 DAPS II Operations. The DAPS II shall operate continuously without operator intervention. All DCP message data shall be received at WCDAS. The DAPS II shall provide all DCS data ingest, handling/processing in real time at the WCDAS.

2.3.2 DAPS II Monitoring. The DAPS II shall monitor and display all system events that could generate an alarm. Alarm conditions shall be signaled audibly and visually, using colors, blinking, and highlighting on a display terminal and shall be continued until the Government DCS operations personnel acknowledges the alarm condition. The DAPS II shall provide the capability at each workstation to "mask out" individual alarm conditions so that they are no longer signaled. Alarms that are so disabled shall be recorded in the system record and presented in a display available for viewing.

DAPS II shall monitor the following DCS hardware and interfaces: DCP data and the receipt thereof from the Data Acquisition and Monitoring System (DAMS), DQM automatic DOMSAT retransmission request, DCS Interrogate Control Equipment (DICE) equipment status (uplink pilot carrier frequency and NIST timing signal), test data from the DCS Test Transmitters, and CIMS channel interference detection, and other DAPS II communications interfaces.

The DAPS II user interface shall provide the capability for Government DCS Personnel to modify displays, define new displays, search for parameters on displays, create displays dynamically, use cut and paste functions to build displays, and specify the update rate for displays.

2.3.3 DAPS II System Configuration. The DAPS II system shall be reconfigurable by Government DCS Personnel without loss of data or interruption of system operation. Changes in system configuration shall be recorded in the system record and presented in a display for the Government DCS operations personnel. To enable rapid system changes to predetermined conditions, twenty (20) stored DAPS II system configurations shall be provided.

2.3.4 DAPS II Access Control. The DAPS II shall have secure access control for the DCS such that only authorized Government DCS Personnel and DCS Users may have use of the system. Access to the system via Internet shall be fully protected against intrusions, computer viruses, etc. by the use of a COTS firewall level or other hardware and software. The DAPS II shall meet all NOAA security requirements specified in paragraph 2.10.4.

2.3.5 DAPS II Database Access Privileges. The ability for DCS Users to view and modify the contents of the DAPS II database tables shall be limited as defined by Government DCS Personnel. Government DCS Personnel shall have the capability to modify the access

privileges for individual DCS Users. Displays shall be provided to reflect all DCS Users that have access to the DAPS II.

2.4 COMPATIBILITY

The DAPS II shall be compatible with all of the existing DCS equipment and interfaces to the data dissemination links. DAPS II shall maintain the current message data contents, 31 bit DCP address, and header formats, and include processes that provide systems data file management, monitoring, statistics, and reporting. All existing DAPS database files shall be converted so that they are compatible with the DAPS II Database Management System (DBMS), as well as any other DAPS data required for DAPS II processing and testing required during system phase over transition. In addition to the DAPS data file conversion, the DAPS II shall import from the present DAPS the date of the last valid message received from each inactive platform. Further details on database contents required for conversion are described in Section J-4. Following installation and preliminary acceptance testing, there will be a transition to phase-in period.

The DAPS II shall be compatible with the following:

- 2.4.1 Existing Message Data Format and Header. The DAPS II shall disseminate DCP messages, data and related quality information, in the same format as the present DAPS for the DOMSAT, NWSTG, Asynchronous dial-in and Internet (see Appendix D of the DAPS User Interface Manual in Attachment J-4).
- 2.4.2 Existing DAPS Database Tables. The information contained in the existing DAPS databases and/or tables shall be converted for the DAPS II, as well as any other data files necessary for DCS operations (see Attachment J-4).
- 2.4.3 Existing DCS Interfaces. The DAPS II shall be physically, electrically and functionally compatible with existing DCS hardware including: DAMS demodulators-multiplexers, DQM, DCS Test Transmitters, DICE, CDA Station Timing System, and the CIMS (see Attachment J-4).
- 2.4.4 Existing User Interfaces. The DAPS II shall be compatible with all existing user interfaces for the dissemination of DCP message data via DOMSAT, NWSTG, asynchronous dial-in, and the Internet. Access to the DCS database information for viewing and modification shall be provided via existing asynchronous dial-in circuits and/or the Internet.

2.5 REAL TIME DATA PROCESSING

The primary functions of the DAPS II are performed in real time. The DAPS II shall ingest, demultiplex (in the case of 100 and 300 bps), and perform quality control monitoring of all DCP message data received at 100, 300, 1200 bps via the GOES. After receipt the DAPS II shall process, generate a header, and disseminate each DCP message via the DOMSAT, NWSTG, asynchronous telephone modem, and the Internet communications circuits. The DAPS II shall provide 30 days of DCP message data storage. Any message in storage shall be accessible by Government DCS Personnel and DCS Users. The DAPS II shall also maintain statistics on DCP message data, the dissemination thereof with and without errors. Aside from the DCP message data, the DAPS II shall also issue commands to and maintain control of the DCS test transmitters, interrogate modulators, and the CIMS, and monitor the status of all DAPS II internal equipment as well as the DAPS II internal and external interfaces.

Since most DCP message data is received on a scheduled basis, scheduling information for self-timed and interrogate type DCPs shall be contained in the DAPS II platform database table. This scheduling data is needed to insure that DCP message data arrives in its assigned time slot and assigned channel for Government DCS Personnel to allocate time on each of the 233 channels among the active DCPs. Although there is no scheduling information for a random reporting DCP, the DAPS II shall monitor the status of all random type DCPs in the platform owners system (see Daily Platform Summary report in the DAPS Operator/Manager Manual). Scheduling information shall be made available for display by platform, by channel, and by User ID, at a minimum. The DAPS II shall provide one hundred (100) real time status displays in single or multiple page tiled or overlaid format. These displays shall be able to show individual DCP messages data in HEX and ASCII format; the self-timed, interrogate, test transmitter, and CIMS schedules in five second intervals in a scrolling fashion; activity on each channel's DCP message data ingest and on each message dissemination interfaces; a general display showing the system's configuration, active components, number of active channels by satellite, etc.; a display showing the number of DCS Users active on the dial-in or Internet interfaces; a display showing the status of all system components; and other displays to be defined by Government DCS Personnel. The DAPS II shall include utilities to modify existing and generate new real-time displays as the need arises. All real time displays shall be individually accessible by Government DCS Personnel, with selected access by DCS Users.

2.5.1 DAPS II Data Ingest. The DAPS II shall simultaneously ingest and demultiplex DCP message data from up to 233 channels with a combined data rate of up to 280 kbps with no flow control, and with a multiplexing overhead of 200%. The Government DCS Personnel shall be able to reassign/configure any data ingest port from any system workstation, without the need to physically re-cable, with no loss of data or interruption of system operation, and to enable/disable any of five pre-defined channel configurations.

- 2.5.1.1 The DAPS II shall have 35 asynchronous DAMS interfaces. This interface is defined in Attachment J-4.
- 2.5.1.2 Twenty (20) synchronous to asynchronous convertors shall be provided for the existing complement of 10 channel 100 bps DAMS chassis. The interface definition for the existing DAMS is included in Attachment J-4. The converters can be a COTS adjunct or a custom development. If the convertors are custom developed the requirements of NESDIS Standard S24.802: "General Requirements for Electronic Equipment" apply.
- 2.5.1.3 The DAPS II shall have the capability for Government DCS Personnel to control the assignment of each demodulator to a specific channel(s). This capability shall account for the different demodulator data rates of 100, 300, or 1200 bps.
 - 2.5.1.3.1 The DAPS II shall have the capability to assign one demodulator to each channel per GOES spacecraft. DAPS II shall accommodate demodulators of different data rates mounted in the same DAMS chassis, where possible.
 - 2.5.1.3.2 Each DCS channel shall normally be designated for receipt of one and only one type of transmission, either self-timed, interrogate, or random reporting, and one bit/data rate of 100, 300, or 1200 bps. A DCP may be programmed for a primary transmission type and a secondary transmission type, and transmit on a primary and secondary channel.
 - 2.5.1.3.3 A DCS channel may not normally be assigned to more than one operational demodulator. Government DCS Personnel shall have the capability, by special command, to add additional demodulators to a single channel for monitor and test purposes. DCP data received from these demodulators shall be directed to a test queue and not disseminated to users.
 - 2.5.1.3.4 With the asynchronous DAMS interface and the existing synchronous design, up to ten (10) distinct, but not necessarily adjacent, 1.5 kHz channels can be assigned to each of the ten-channel, 100 bps or 300 bps demodulator-multiplexers. However, all of the assigned channels shall be from the same GOES spacecraft.
 - 2.5.1.3.5 The 1200 bps DAMS demodulators require a 3 kHz channel bandwidth of two adjacent 1.5 kHz channels. The DAPS II channel assignment shall account for this.
 - 2.5.1.3.6 The DAPS II shall support the transition of DCS Users from low data rate 100 bps channels to the new higher data rate 300 bps, while preserving the test transmitter functionality and quality control monitoring of the message data.

- 2.5.1.4 DAPS II shall collect the best quality signal from dual feeds for international platforms reporting via both GOES spacecraft on the same channel. If the quality parameter is equal both signals, then the GOES East signal shall be used.

2.5.2 DAPS II Scheduling, Control, and Monitoring. The DAPS II shall use the DCP scheduled time, type, and channel assignment to monitor the self-timed and interrogate type platform message data arrival and to control the interrogation of DCPs.

- 2.5.2.1 On any DCS channel the DAPS II shall be able to schedule the receipt of self-timed and interrogate DCP message data over a twenty-four (24) period. The DAPS II shall use this schedule to monitor the arrival of the data. The schedule shall be capable of supporting a 5 ± 0.5 second self-timed message. For self-timed DCPs, the DAPS II shall compare the times the DCPs are expected to report versus the time of actual message arrival. For interrogate DCPs, the DAPS II shall contain the times when the DCPs are to be interrogated and their respective numbers of allowed retries. The Government DCS operations personnel shall have the capability to display and print all or part of a channels' daily schedule and to make temporary changes to this schedule which are not to be reflected permanently in the DCP's database.

The present DAPS uses the information in its platform data table to generate the schedule. The following DCP data fields are used to accomplish this:

DCP Address
Primary DCP Type
Secondary DCP Type
Primary DCP Channel
Secondary DCP Channel
Time First Daily Transmission
Time First Daily Interrogation
DCP Data Rate
Time Interval Between Transmissions
Time Interval Between Interrogations
Maximum Number of Interrogation Retries
Maximum Transmission Window Size
DCP Data Format
DCP Preamble Type
Date/Time Last Message

- 2.5.2.2 The DAPS II shall control the two DCS Interrogate Modulators (DIM). The interface requirements for the DIM are set forth in Attachment J-4. The DAPS II shall send

interrogate commands to the respective DIM at the time identified by user in DCP's PDT; shall record that the interrogation command was sent; and flag errors if the interrogate message data was not received after the number of interrogate retries is exhausted. If an interrogate DCP has not replied within two minutes of the interrogation or the DCP message is received in error, the interrogation command shall be repeated and the retry counter shall be updated. If the interrogate DCP does not reply within two minutes of the last allowed retry, an indication that the interrogation was sent shall be replaced with an error message for that time frame. This message shall be broadcast through the DOMSAT and NWSTG links as appropriate, and stored in the DCP message data as an error condition. If no message data is received from any interrogate DCP over a 48 hour period its PDT shall be marked inactive and all other DAPS II activities shall cease. The interrogate DCP will now require manual, operator, or primary owner interrogation to restore the above activity in the system.

When there are no scheduled platform interrogations, the DAPS II shall send a "dummy interrogation (DCP address 3485763E) every 0.5s. to verify the functionality of the DCS interrogate links.

- 2.5.2.2.1 S/I DCP Auto Interrogation. Whenever a Self-timed (primary)/ Interrogate (secondary) (S/I) DCP does not report in its scheduled time slot, the DAPS II shall issue an interrogation of the DCP until the retry count is exhausted. The interrogation shall be issued via a DCP secondary address on the assigned DCPs secondary channel.
- 2.5.2.2.2 Random DCP Event Triggered Interrogate Requirements. The DAPS II shall include an Event Triggered Identifier (ETI) and a secondary address in the database to identify random 'R' type DCPs for which the event triggered interrogate requirements apply. Event triggered interrogations shall be identical to those issued for other interrogate DCPs except that a response message from the interrogated DCP will not be received. Thus, event triggered DCPs operate as primary 'R' and secondary 'I' DCPs.

To satisfy the event trigger interrogate requirement there shall be two DCP sub-types; test and special. The test message type DCPs are used to insure the operational integrity of the event trigger equipment. The special type DCPs actually issue the warning or emergency event message that warrants immediate attention.

The DAPS shall provide the following for the ETI sub-types:

- A. Upon receipt of a test or special message from the event triggered DCP, the DAPS II shall issue, on a secondary address and channel, an interrogation. The DAPS II shall record that the interrogation was issued and a response

DCP message was not expected. Interrogations are to be repeated until the retry count is exhausted.

- B. Whenever a special event trigger message is received, its interrogation shall be issued as soon as possible on the given DCS channel and spacecraft, before other DCPs scheduled to be interrogated. This preemption is not required when the test event trigger message is received.
- C. The DAPS II shall issue an alarm whenever a special event message is received to initiate the event trigger process. The alarm is not to signify an abnormal condition but rather inform the Government DCS Personnel of a special event. The DAPS II shall record and maintain event statistics whenever test messages are received by event triggered DCPs.
- D. The DAPS II shall be able to provide Government DCS Personnel with statistical data on all event trigger activities or on a single selective ETI basis. The DAPS II shall also provide the capability to retrieve statistics on an ETI categorized by test, special, or total message activities over a pre-selected interval.
- E. The DAPS II shall have a capability to monitor in total, or in part, as well as internally test, the event triggered interrogation requirement.
- F. The DAPS II shall provide the ability to create, update, or delete interrogation address entries for either test or special message DCPs.

2.5.2.3 DCP Message Data Handling Process. For each DCP message received, the DAPS II shall generate a header and perform the quality checks identified below.

2.5.2.3.1 For each DCP message received, the DAPS II first shall check the DCP Address against those in the database. If the address is not found, the DAPS II shall attempt to correct the address by using the redundant information contained in the BCH code and by comparing the time and channel of receipt with the database information. If the correction is successful, the corrected address shall be used and the Failure Code for the message shall be annotated to indicate that a correction was made. If the correction attempt fails, the message shall be considered in error, with its header annotated accordingly, broadcast through the DOMSAT and NWSTG links as appropriate, and stored.

2.5.2.3.2 The DAPS II shall then compare the channel from which the message was input to the Primary and Secondary Channels assignments for that DCP. If the channels do not match, or do not correspond to the respective Primary or Secondary DCP type, the message shall be considered in error, with its header annotated accordingly, broadcast through the DOMSAT and NWSTG links as appropriate, and stored. Otherwise, the message shall continue to be processed according to the DCP type associated with the channel on which it was received.

2.5.2.3.3 When a message is received, the associated database entry for Date/Time Last Message shall be updated and the message shall be broadcast through the DOMSAT and NWSTG links as appropriate and stored. If the DCP was previously deactive, the Active/Deactive field in the database shall be set to active.

For random 'R' type DCPs the DAPS II shall also determine if the user has exceeded the daily time quota for all DCPs (current daily time quota for one random platform, 60 seconds, multiplied by the number of platforms owned by that user assigned to that channel). This shall be included in the platform daily report as done in the current DAPS.

2.5.2.3.4 If a DCP message is received on an interrogate channel, the DAPS II shall check to determine if an outstanding interrogation existed. If not, the message shall be considered in error and its header annotated accordingly. Otherwise, the message shall be considered valid and the database updated to indicate that the outstanding interrogation no longer exists and its PDT record is updated. In both cases, the message shall be broadcast through the DOMSAT and NWSTG links as appropriate and stored.

If the message was received on a self-timed channel, the DAPS II shall check to determine if the message was received within the Transmission Window for the DCP. For each self-timed DCP, Transmission Windows begin at the Time of First Transmission and at multiples of the Time Between Transmissions thereafter throughout the day. Transmission Windows end when the Maximum Transmission Window Size, for the associated DCP, has elapsed after the window began. To be considered received within the window, the message transmission must begin and end within the window.

Note that a message transmission begins either eight seconds or one second (for 100 bps demodulators only) before the receipt time contained in the message, depending on the DCP preamble type, which can be Long or Short, respectively. If the message is not received within the window, it shall be considered in error and annotated

accordingly. However, if the DCP was previously deactive and the time the message was received was consistent with the corresponding database entry, then the database shall be updated to indicate that the DCP is now active and the Date /Time Last Message received status update. Otherwise, the message shall be considered valid and its database new Date/Time Last Message received entry updated. In all three cases, the message shall be broadcast through the DOMSAT and NWSTG links as appropriate and stored.

2.5.2.3.5 If no part of a scheduled message from a self-timed DCP is received by the end of its Transmission Window, an error message shall be constructed, broadcast through the DOMSAT and NWSTG links as appropriate, and stored. The database shall then be checked to determine if the Date/Time Last Message is more than a Government specified number of hours past, and if so, the DCP shall be marked deactive in the database and not monitored actively by the DAPS II.

2.5.2.3.6 Each data character received from DCPs whose DCP Data Format is ASCII shall be checked for correct parity. Characters with parity errors shall be replaced with dollar symbols (\$) and the Failure Code shall be coded with a question mark (?) before the message is broadcast and stored.

2.5.3 DAPS II Message Data Handling/Processing. In real time, the DAPS II shall process and store all incoming DCP message data. For each message, the DAPS II shall store the valid DCP address, a time tag, failure code, DAMS measurements, DCS channel, GOES S/C ID, message length, and the message data field. Examples of the DCP messages with headers are included in the User Interface Manual, Appendix D.

2.5.3.1 The DAPS II shall store DCP messages for later retrieval by Government DCS Personnel and DCS Users, for potential retransmission, for backup, and for reporting. No alterations shall be made to the message data or header information after a message has been stored. The DAPS II shall also record every instance where a DCP message is received in error.

2.5.3.2 The DAPS II shall retain all DCP data messages stored for a 30 day interval.

2.5.3.3 Government DCS Personnel and DCS Users shall have access to any DCP message data currently stored by the DAPS II. The typical retrieval method will be by specification of a DCP address and a range of dates and times. DCS Users may also request message dissemination by using their User Network List (UNL).

- 2.5.3.4 Each DCP message shall contain the message data received and the data fields identified below and included in Attachment J-4. Provision shall be made for growth of up to 100% in the number of data fields identified below.
- 2.5.3.4.1 The DCP address in 8 character hexadecimal format. If a message is received with an invalid address, the DAPS II shall insert a dummy platform address.
- 2.5.3.4.2 The Date and Time the DCP message was input into the DAPS II.
- 2.5.3.4.3 DAPS II DCP message data errors which are detected at ingest. Errors shall cause the appropriate indicators to be set and stored with the DCP message data (see Table 2.1 DAPS Abnormal Response Messages for Platform Data as described in the DAPS User Interface Manual). If DCP message data is received correctly, this field shall contain a letter G indicating a good message. For completeness these are included below:
- Message received with parity errors, coded by a question mark (?).
 - Expected message not received or missing message (Type S or D DCP), coded by letter M.
 - Message received at wrong time late or early (Type S or D DCP) or without interrogation (Type I DCP), coded by letter T.
 - No message after maximum interrogation retries (Type I DCP).
 - Message received at wrong time late or early (Type S or D DCP) or without interrogation (Type I DCP), coded by letter T.
 - Message received with wrong, but valid, correctable address coded by letter A.
 - Message received with invalid address not in the DAPS II database, coded by letter I.
 - Message received on wrong channel coded by letter W.
 - Message received on multiple channels, coded by letter D.

Message received with bad, not correctable address, coded by letter B. Herein, the DAPS II shall insert a dummy platform address (BBBBBBBB) for all messages received with this type of error.

Unexpected message, coded by letter U.

Database record is incomplete, coded by letter N.

Bad DAMS data quality measurements, coded by letter Q.

Test transmit comparison error, coded by letter C.

- 2.5.3.4.4 Four DAMS Demodulator Multiplexer Data Quality Measurements appended to each message by the DAMS - Message Signal Strength, Message center frequency offset, Modulation index code, Data quality code. The first two of these are defined by two ASCII characters while the last two have one ASCII character.
- 2.5.3.4.5 DCS Channel on which message was received.
- 2.5.3.4.6 GOES spacecraft from which message was received.
- 2.5.3.4.7 The length of the DCP message received, in bytes.
- 2.5.3.4.8 The DCP message data. If any errors are detected in the ASCII message data, characters having parity errors should be replaced with dollar symbols (\$) when a display command is used by Government DCS Personnel or DCS Users.
- 2.5.3.5 Stored message data shall be complete and ready for further review by DAPS II for retrieval and reporting immediately after real time storage.
- 2.5.3.6 The DAPS II shall process realtime data and retrieve and report on stored data simultaneously.
- 2.5.3.7 The DAPS II shall provide the capability for Government DCS Personnel to view dynamically the ingest of DCP message data.
- 2.5.4 DCS Test Transmitter Requirements. The DAPS II shall schedule and have primary and full control of the two (2) DCS Test Transmitters (TTs) over an asynchronous interface, subject to override by the Government DCS Personnel. The primary function of the TTs is to provide

continuous, automatic testing of the DCS channels to alert the Government DCS Personnel of possible failures in spacecraft or ground equipment.

The DAPS II shall command, control and monitor the two (2) DCS TTs (see Attachment J-4). The DAPS II shall be able to change the text or message data for the TT, the preamble (short or long), the channel data rate (100, 300 or 1200 bps), and support manual and scheduled TT blocking functions. DCS Government Personnel shall be able to generate a TT test message up to the maximum message length of 15,750 bytes.

- 2.5.4.1 The DAPS II shall schedule and monitor test transmissions on all DCS channels without conflicts between the TTs. If a conflict occurs there shall be an event alarm. The DAPS II shall attempt to test all channels at approximately the same rate, subject to constraints to avoid interference with scheduled DCP transmissions. Interrogate and self-timed channels shall be tested only when the database indicates that no DCP messages are expected. A test transmitter must be exercised on each active channel at least once every two (2) hours.
- 2.5.4.2 Tests of random reporting channels shall follow the same ALOHA-style protocol as employed by the respective DCPs; i.e. tests shall not be initiated while transmissions are being received or if they are expected during the 18 second duration of the test. Failed tests shall be repeated after waiting for a random time interval to pass.
- 2.5.4.3 Failed tests shall be repeated up to the Maximum Number of Test Retries, after which time an alarm condition shall be signaled. The Maximum Number of Test Retries parameter shall be controlled separately for each DCS channel. It is anticipated that random reporting channels will exhibit a considerably higher TT failure rate than other channel types, since collisions with legitimate random reporting DCP messages are likely. A record of each unsuccessful test shall be made in the system's Test Transmitter Failure Log (TTFL) (see paragraph 2.5.9.4).
- 2.5.4.4 The DAPS II shall accommodate manually scheduling of test transmissions by time and channel, with a capability to check that no message data is blocked. When issuing a manual test transmission the DAPS II shall check to see if a platform message data is scheduled and issue a warning to the Government DCS Personnel. The Government DCS Personnel shall have the ability to override this warning and perform the test transmission (i.e., the channel would be blocked) and the action shall be recorded in the DAPS II.
- 2.5.5 DCS Transponder Bandpass Adjustment. The DAPS shall be able to automatically adjust the DAMS signal strength measurement to compensate for ripple of up to 2 dB across the 400 kHz bandpass,. The DAPS shall adjust and/or compensate for the ripple for all DCP data received

on each active DCS channel by a differential amount determined by using DAMS data extracted from the DCS test transmitter.

- 2.5.6 DCP Message Data Dissemination. The DAPS II shall output DCP message data to the DOMSAT broadcast link, the NWSTG dedicated modems, asynchronous telephone dial-in modems, and Internet interfaces. The definition and requirements for these communications circuits are included in paragraph 2.9.
- 2.5.7 DOMSAT Data Quality Monitor (DQM). A new DQM shall be developed and provided as a part of the DAPS II that will provide identical functionality to the present DQM operating in the DAPS (see DQM Operations and Maintenance manual). The DQM shall be integral to the DAPS II and used to determine the need for automatic retransmission of DOMSAT broadcast messages. The DQM shall continuously monitor the DOMSAT data stream bit error rate (BER), Cyclic Redundancy Check (CRC) Checksum errors, and message sequence number errors. Messages not meeting the above conditions over a one minute interval shall be queued for retransmission by the DAPS II. All retransmissions automatically executed by the DQM shall be recorded and this record shall be available for recall. All screens and displays on the DQM shall be accessible by the DAPS II workstations and available for display to the DCS Users. The DQM shall interface to the DOMSAT up/down links that are presently in place at WCDAS.
- 2.5.8 DCP Real Time Diagnostics. The DAPS II shall contain real-time online diagnostics that automatically monitor all active DCS channels to ensure that DCPs are transmitting on their assigned channels, in their assigned time slots (S & D), and at their assigned time intervals (S and I). Whenever a DCP is interfering with another, Government DCS Personnel must resolve the problem and notify the interfering DCP owner to turn off the errant DCP as soon as possible. Some factors to consider in developing these utilities are:
- A. A large percentage of all DCPs (≈ 5 per cent) exhibit these problems.
 - B. Due to their remote location(s), some DCPs may continue to operate improperly for an extended period of time.
 - C. These problems are erratic in nature in that an errant DCP may operate correctly sometimes and incorrectly at other times.
 - D. If an errant DCP is not actually interfering with another DCP, it may be desirable that correction of the problem be deferred for as long as possible to enable a detailed evaluation of the problem.

- E. The Government DCS Personnel should be informed of these problems when they first occur, but should be able to mask over the events' occurrence if they continue to persist. When the problem is corrected or if the problem disappears, over a 24-hour period, the time of occurrence of this event shall be included in the system's log.
- 2.5.8.1 The DAPS II shall provide Government DCS Personnel with diagnostic software and/or test procedures to deal with errant or interfering DCPs. The DAPS II shall detect the incident, signal an alarm for Government DCS Personnel, make a record of the event and provide a corrective action to the Government DCS Personnel. The diagnostic routine(s) shall evaluate, correct bypass, ignore, and/or statistically characterize such DCP problems. The interference monitoring functions of the existing DAPS CIMS shall be developed and integrated as part of the DAPS II system. For DAPS II development purposes, the existing CIMS equipment may be used to analyze and determine the appropriate corrective action(s).
- 2.5.8.2 The DAPS II shall detect the following DCP failure modes and provide the Government DCS Personnel a report on demand, identifying:
- A. DCP(s) transmitting in the wrong time slot.
 - B. DCP(s) transmitting on the wrong channel.
 - C. DCP(s) transmitting on multiple DCS channels.
- 2.5.8.3 DCP(s) transmitting with an incorrect DCS address (but not valid for another DCP).
- Note that occasional bit errors can cause an address to be wrong. Multiple occurrences of the same (wrong) address must be identified to determine whether this DCP is reporting an improper address.
- 2.5.8.4 When a Government DCS Personnel selected number (N) of previously active scheduled DCPs stop reporting, where N is selectable by DCS channel, a channel failure notice shall be posted and this event shall be entered into the system's outage log. This is indicative of a channel failure or a channel that is being blocked.
- 2.5.8.5 Diagnostic routines shall analyze DCP messages received for conflicts between scheduled and actual receipt time and channel assignment, determine the error category as presented in the descriptions of the Reschedule and Wrong Channel Logs (see DAPS Operator/Manager Manual in Section J-4).

Whenever any of the above events are detected by the DAPS II, and the interference persists over a 30 minute period, a notice of channel outage must be posted for the appropriate DCS channel users and the SOL shall be updated. Government DCS Personnel shall also have manual control on the transmission of all such notices.

2.5.9 DAPS II Realtime Record Keeping. The DAPS II shall automatically maintain records that list system event statistics, not message data, with the dates and times events occur. Real time events to be recorded, for example, including the number of messages received, the number of messages received in error, platform generated alarms, system and system interface generated alarms, channel interference alarms, and system outages. The DAPS II shall also record any user data access or retrieval and all Government DCS Personnel actions. A three day circular record shall be retained in nonvolatile storage to enable event reconstruction in the case of a catastrophic system failure. The system record shall contain 60 days of system events and be capable of being stored for one (1) year, long term storage. Summary statistical reports shall be produced on a monthly, quarterly and annual basis to be stored on the system and available to Government DCS Personnel and DCS Users via the web-based GUI for a period of ten (10) years. The DAPS II record shall be accessible by ad hoc inquiries by Government DCS Personnel.

2.5.9.1 The DAPS II shall maintain and update all records automatically without manual intervention.

2.5.9.1.1 Record updates performed by the DAPS II shall be accomplished in real time and shall not prevent concurrent (time shared) access to the data for retrieval and reporting.

2.5.9.1.2 The DAPS II shall provide a utility to enable the Government DCS Personnel and DCS Users to search and sort by date, time, keyword, or event number and create reports from information captured in DAPS II records.

2.5.9.2 The DAPS II shall record DCS events and a utility shall be provided to recall these events in a report format. The utility shall provide searches based on wildcards, event numbers, time ranges, etc. These events shall be date/time tagged and shall include the following:

- A. Alarm conditions, other than those whose source is recorded in the SOL or other databases.
- B. All Government DCS Personnel modifications to databases, software, and hardware configurations.
- C. All user accesses to the DAPS II and to DAPS II databases.

- D. All successful test transmissions.
- E. All interrogation requests.
- F. All retransmission requests, either automatic or User DCS requested.

2.5.9.3 The DAPS II shall maintain a System Outage Log (SOL). The SOL shall record all system failures automatically as they occur in real time. The SOL shall be similar to that of the present DAPS except SOL events shall be automatically entered where possible (see paragraph 5.4 of the DAPS Operator/Manager Manual).

2.5.9.3.1 The DAPS II failures recorded in the SOL shall be retained for the ten (10) year life of the system in a text file on a month by month basis..

2.5.9.3.2 The Government DCS Personnel shall have access to and control over the SOL. No other access shall be allowed.

2.5.9.3.3 Each entry in the SOL shall contain:

- A. The date and time of the failure
- B. The date and time of recovery to fully operational state
- C. Identification of the failed component.

2.5.9.4 The DAPS II shall maintain a Test Transmitter Failure Log (TTFL). The TTFL shall record all failed test transmissions. The TTFL shall be identical to that of the present DAPS (see DAPS Operator/Manager Manual in Attachment J-4).

Note that these events include only failed tests, not failures of the test transmitters themselves, which are instead recorded in the SOL.

2.5.9.4.1 The test failures recorded in the TTFL shall be retained for the ten (10) year life of the system. At any time Government DCS Personnel shall be able to transfer and store this data in an offline data file. The Government DCS Personnel shall have full access to and control over the TTFL. No other access shall be allowed.

2.5.9.4.2 Each record shall contain the following:

The date and time of a failed transmission

Failure code:

0002 - Message not received

0003 - Message received with errors

0004 - Message error free, address in error

0005 - DAMS measurements out of tolerance

DCS channel

GOES spacecraft

Test Channels

DCS Demodulator slot and DAMS Demodulator drawer

DAMS measurements received

2.5.9.5 Channel Interference Monitoring System (CIMS) Requirements. The DAPS II shall record DCS channel interference events. The DAPS II shall monitor for interference events by DCP, satellite, channel, or time range as specified by Government DCS Personnel. Whenever a DCP repeatedly exhibits interference problems, the DAPS II shall count and sort these events by DCP to enable Government DCS Personnel to evaluate and quantify the regularity of such events. The interference events recorded via spectrum analyzer plots shall be in the form and/or media suitable for sending by email or FTP to the appropriate site.

2.5.9.5.1 DAPS II shall perform the CIMS function of the DCS to monitor and record interference detected on all DCS channels. The present DAPS has CIMS capability implemented with a Personal Computer (PC) with a data interface card, LabView software, a Sutron frequency agile demodulator with chassis, and an HP spectrum analyzer. The CIMS function shall be replicated as an integral function of the DAPS II.

2.5.9.5.2 DAPS II shall monitor and record channel interference activity on all 233 active domestic and assigned international channels. The DAPS II shall by Government DCS Personnel command, capture spectrum analyzer sweeps and store these in files for up to a week. The DAPS II shall use a CIMS like capability as described above to accomplish this.

2.5.9.5.3 CIMS Archive. The DAPS II shall provide the capability to capture, store, and archive test transmitter or DCP message data transmissions. DAPS II shall generate a report at the request of Government DCS Personnel summarizing the results of the CIMS monitoring. These stored events shall be available for recall via the DAPS II.

2.6 DAPS II DATABASES.

The DAPS II shall have a Data Base Management System (DBMS). The DBMS shall maintain and support all database records essential to operation and management of the DCS. Any tuning or custom database management software needed to fulfill the DAPS II real-time requirements shall also be included. The DAPS II shall incorporate all of the tables, records and databases of the present DAPS, all of the data fields, their organization and structure. Expansion of the fields and records in the database shall be possible using COTS DBMS tools.

The current DAPS databases are referred to in system documentation as description tables, differentiated from the DCP message data storage. The DAPS II shall perform the central DBMS functions, as well as perform all real time message data handling/processing requirements to support, operate, and manage the DCS. The performance characteristics of the non-real time database management system functions shall not interfere with DAPS II primary mission of real time message data handling/processing, dissemination, quality control and storage requirements.

The system shall be expandable to allow for future needs. This expansion shall include the ability to add new tables and to append contents of such tables to message data before transmission. An example is the decoding of raw message data, where the decoding file or a pointer to a file containing the decoding information, could be attached to the raw message data. A field in the PDT would contain information identifying the appropriate file for attachment.

The DAPS II DBMS shall include Graphical User Interface (GUI) tools for ad hoc queries, wildcard searches, generating statistical management reports, and other utilities set forth in paragraph 2.9. A DAPS II PDT locator utility shall provide Government DCS Personnel and DCS Users with a query search to identify DCPs for constructing the UNL, for example, by DCP location, type of data collected, owner, etc.

2.6.1 Database Conversion. The information contained in the current DAPS database description tables shall be converted to the DAPS II database format. The specific structure of records, fields, files, etc. shall be elements of the total DAPS II system design. The present DAPS contains seventeen (17) database description tables (see paragraph 2.5.4 and Appendix D of the DAPS Operator/Manager Manual, Attachment J-4).

2.6.1.1 Platform Description Table (PDT). The DAPS II PDT shall have capacity for up to 100,000 entries. The PDT shall contain information describing the relevant attributes of each DCP. This information is used both for real time operation of the DCS and for system reference and reports. The attributes include identification, scheduling, data transmission, location, usage, and ownership information. A DCP's basic identification is contained by its 31 bit platform address code in current use. In adding a new entry to the PDT the DAPS II shall perform error cross checking on the entries identified in Attachment J-4

especially with regard to the DCP latitude and longitude when compared with the location data included in the PDT.

The PDT conversion utility shall be delivered to the Government with the systems phase-in transition plan. A current PDT is shown in Appendix C, page C-5 of the DAPS User Interface Manual (see Attachment J-4).

- 2.6.1.2 User Description Table (UDT). The DAPS II UDT shall have capacity for up to 10,000 entries. The current DAPS UDT contains 5000 entries and identifies primary and secondary users of the GOES DCS. Primary users are organizations that have operational responsibilities for the control of the DCPs and contains further information about the owners, their Internet node, their DAPS II MOA and their maintenance personnel as required for day to day operations. Secondary users have the same data field entries but only access other DCP data and do not have responsibility for the deployment and maintenance of the DCP. Access to the UDT is selectively controlled such that owners/users may view their own file records and modify selected fields, but have no access to other user data records.
- 2.6.1.3 Memorandum of Agreement (MOA). The DAPS II MOA shall have capacity for up to 10,000 entries. The current DAPS MOA contains 5000 entries with information describing each DCS user. The MOA data shall be access controlled to permit full update by the Government DCS Personnel and permit DCS Users access to view their own Administrative MOA with NESDIS. The MOA shall be linked with the UDT and be accessible from that user data record. Access is given to all DCS Users to view only unprotected MOA data.
- 2.6.1.4 Radio Description Table (RDT). The DAPS II RDT shall accommodate up to 500 entries. The current DAPS RDT contains 250 records to be converted describing each certified DCP in the GOES DCS to date.
- 2.6.1.5 Channel Description Table (CDT). The DAPS II shall contain a replicated CDT. It contains the configuration files for the DAMS demodulators and/or chassis.
- 2.6.1.6 System Hardware Status (SHS). The DAPS II shall contain a replicated SHS. The SHS contain a listing of all the major components of the GOES DCS and their current operational status. This file shall have a GUI routine to enable easy updating by the Government DCS Personnel as changes to system operations, failures, repairs, and other changes to system status occur.
- 2.6.1.7 System Outage Log (SOL). The DAPS II shall maintain a SOL per paragraph 2.5.9.3. The SOL contains failure history of the DCS.

- 2.6.1.8 System Configuration Table (SCT). The DAPS II shall retain the functionality of the DAPS SCT. The SCT contains the configuration of the DCS.
- 2.6.1.9 User Network List (UNL). The DAPS II shall retain the functionality of the DAPS UNL capability. The UNL contains up to five (5) lists of DCPs for each DCS User. Access to the UNL is via a user's UDT. The UNL is used for DCP message data retrieval. DAPS II shall have the ability to generate a UNL via a query to search the PDT for specific DCPs, for example by location.
- 2.6.1.10 User Statistics Table (UST). The DAPS II shall retain the functionality of the DAPS UST. The UST contains the monthly usage statistics for each DCS User.
- 2.6.1.11 Channel Statistics Table (CST). The DAPS II shall retain the functionality of the DAPS CST. The CST retains monthly statistics for each DCS channel.
- 2.6.1.12 DOMSAT Statistics Table (DST). The DAPS II shall retain the functionality of the DAPS DST. The DST contains the monthly DOMSAT statistics.
- 2.6.1.13 Asynchronous Statistics Table (AST). The DAPS II shall retain the functionality of the DAPS Asynchronous Statistics Table (AST). The AST contains the monthly interactive dial-in line statistics.
- 2.6.1.14 Internet Statistics Table (IST). The DAPS II shall have an IST. The IST shall perform many of the same functions of the present DAPS Interactive Statistics Table (IST). The new IST shall contain the monthly interactive Internet interface statistics.
- 2.6.1.15 Message Statistics Table (MST). The DAPS II shall retain the functionality of the DAPS MST. The MST contains the monthly message statistics.
- 2.6.1.16 NWSTG Statistics Table (NST). The DAPS II shall retain the functionality of the DAPS NST. The NST contains the monthly NWSTG (formerly NMC) statistics.
- 2.6.1.17 Platform Statistic Table (PST). The DAPS II shall retain the functionality of the DAPS PST which contains DCP monthly statistics.
- 2.6.2 Database Security. The DBMS shall have the capability to allow DCS Users selective access to view or modify individual fields and records in the database according to access privileges established by Government DCS Personnel. Access to any DAPS II database shall be based upon the DCS User identification established and verified at the time of the user's logging onto the system. Government DCS Personnel shall have complete access to view and modify all fields of the DAPS II database based on access privileges. (See paragraph 2.10.4)

- 2.6.2.1 The DAPS II shall support database access control for viewing and modification by Government DCS Personnel and DCS Users. The current DAPS data formats are provided in Attachment J-4.
 - 2.6.2.2 Changes to access control and viewing privileges of database table records shall be controlled by Government DCS Personnel without affecting continuing operations. Changes to access privileges shall be recorded by the system.
 - 2.6.2.3 The Government DCS Personnel and DCS Users shall have the interactive capability to review and update the database contents according to access privileges. Global field calls shall be permitted for review or database update. Review capabilities provided shall include the ability to list, in both hardcopy and interactive display format, the entire contents of any record or selected set of records that may be specified through multi-field selection criteria.
- 2.6.3 Database Management. Database management shall be exercised by Government personnel at the Suitland Federal Center, Suitland, Maryland. DAPS II shall provide sufficient capabilities to implement all of the database update, retrieval, and reporting functionality discussed in this section. In general, typical database functions such as ad hoc query, wildcards, Boolean and global search shall be provided. The use of COTS database software is encouraged.
- 2.6.3.1 During additions or changes to a database, the affected database shall continue to be fully available for multiple access by Government DCS operations personnel and, if applicable, DCS Users.
 - 2.6.3.2 History of database record changes shall be recorded in chronological order and made available to Government DCS Personnel, including platform and channel records. DCS Users shall have the ability to request a display that shows selected PDTs that have been changed on a daily basis as is done with the present DAPS, except the DAPS II shall include actual data field change(s) per PDTs included in this display. The history shall be retained for a one year period and be capable of transferring to a hard copy media by Government DCS Personnel.
 - 2.6.3.3 The DAPS II shall provide offline backup of the database on removable media, with restoration capability in the event of severe failure. The frequency of backups shall be hourly with a one week retention.
 - 2.6.3.4 All updates to DAPS II database records by Government DCS Personnel and DCS Users, interactively and in batch mode, shall be examined by DAPS II for erroneous (illogical or conflicting) entries. Email shall be used to notify the affected DCS users whenever changes are made to database records as confirmation. Erroneous entries shall not be posted to the

database, but rather shall be reported back to the submitter immediately in the case of interactive submissions, or in an error report in the case of batch updates. Batch submissions containing erroneous updates shall be processed completely, with all valid transactions posted to the database, and all erroneous transactions listed in a single report. Errors in data fields shall be flagged by the DAPS II and displayed in a red color on the screen. Valid entries shall have these attributes:

- A. Platform type shall be consistent with channel assignment.
- B. Transmissions shall be separated in time, from the end of one to the start of the next. This calculation requires knowledge of preamble size, data rate, and message length as well as previously scheduled activity on that channel.
- C. The number of Random Reporting DCPs assigned to a given channel cannot exceed a limit preset by the Government DCS Personnel.
- D. At least one channel time slot shall be reserved for testing.

Note that the TT runs a round robin testing sequence every two hours. Also, diagnostic testing is used to troubleshoot a channel. A dedicated channel for testing is required on each spacecraft. Currently channel 110 is assigned to WCDAS as a test channel on both GOES East and West.

2.7 DAPS II REPORTS

The Government DCS Personnel and DCS Users shall have the capability to produce summary reports from the database. Specified reports shall be generated automatically on a scheduled basis.

2.7.1 DAPS II Report Generation. Government DCS Personnel and DCS Users shall have an interactive utility to produce summary reports, for hardcopy and interactive display, from the DAPS database records. Further the DAPS II shall automatically generate all of the reports currently provided by the DAPS (see Attachment 5.6 of the DAPS Operator/Manager Operations & Maintenance Manual) and up to ten (10) additional reports of similar type and complexity. Some of these reports summarizing data from extended periods (hourly, daily, weekly monthly, and annually) require summary or statistical information to be retained/stored in the DAPS II. The summary data required, the design and implementation of the data files needed to contain them, and the associated software routines to produce these reports shall be determined and provided as part of the DAPS II. Statistical data forming the basis of these reports shall be maintained for the ten (10) year life of the system. Further examples of required reporting capabilities include the following:

- 2.7.1.1 Number of DCPs reporting per hour, day, month, quarterly, and annually, by channel or by group of channels, or by user. The time interval, channel, or user selection is to be specified by Government DCS Personnel.
 - 2.7.1.2 Number of messages disseminated over communication links per hour, day, or month, by link or by group of links, with time interval and link selection as specified by Government DCS Personnel.
 - 2.7.1.3 Recent DAMS measurements from test transmissions, by time, by channel, and by demodulator type.
 - 2.7.1.4 Average hourly channel loading by user, by channel, over selected channels, and over all channels.
- 2.7.2 DAPS II Statistics Charts. Government DCS Personnel and DCS Users shall have an interactive utility to produce summary line, bar, and pie charts, for both hardcopy and interactive display, from the DAPS II statistics database (similar to the DAPS). The data needed to generate these graphical charts shall be selectable using the database inquiry capability. For example, it shall be possible to select a summary of test transmitter failures by channel for a given time period from the Test Transmitter Failure Log and direct that this summary be printed in the form of a bar chart without the need to retype the data for processing by the graphics software.
- 2.7.3 DAPS II Map Generation. Government DCS Personnel and DCS Users shall have an interactive utility to produce maps, for both hardcopy and interactive display, using any combination of latitude and longitude data fields in the DAPS II PDT (described in Attachment J-4) and plotted (overlaid) on background maps of the geopolitical boundaries (continents, countries, states, counties, and provinces) of the selected areas. To accomplish this the DAPS II shall contain a map database which allow concurrent plotting of the geopolitical boundary overlays. The coverage of the database shall be the combined footprint of the two GOES spacecraft. Since the maps to be generated are intended to show qualitative geographic features without close regard to scale, any commonly used mapping projection may be employed.
- 2.7.3.1 The specific locations to be included in such maps shall be selectable using the database inquiry capability, and the area to be mapped shall be given by geographical coordinates or by geopolitical jurisdiction at the Government DCS Personnel or DCS Users' option. For example, it shall be possible to select from the DAPS II database all of a given platform owner's DCPs located within the limits of given latitudes and longitudes or geographic area (e.g., state, county, etc.) and direct that they be plotted on an overlay showing all

geopolitical boundaries within those limits without the need to retype the data for processing by the graphics software.

- 2.7.3.2 Government DCS Personnel and DCS Users shall have the capability to call up a mapping program online that will allow sections of the hemisphere to be selected. Platforms that are within this selected geographic area shall be displayed with a color code indicating whether they are an unused, active, or deactive platform. Selection of a DCP displayed on the map shall result in the display of additional platform information, to include the most recent data received. The capability to update records in the database selected via the mapping utility shall be provided. The Government DCS Personnel and DCS Users shall have the ability to use this DAPS II utility to select platforms, by any combination of criteria, for display if they are located in the geopolitical plot that has been defined.

2.8 DAPS II INTERFACES

DAPS II shall be interfaced to the GOES DCS DAMS demodulators, to the DCS Interrogate and Control Equipment (DICE), to the DQM, to the DOMSAT transmit and receive modem, to the WCDAS NASA 36 bit timing signal, to the NWSTG modem(s), to the ten (10) asynchronous dial-in telco circuits, to a T-1 line between Wallops, VA and Suitland, MD and to the WCDAS and NESDIS Suitland Internet Protocol (IP) addresses in place.

Attachment J-4 to this document contains interface descriptions for the existing GOES DCS equipment. The interface definitions for new equipments or capabilities not currently supported by DAPS, shall be developed as a part of the DAPS II.

- 2.8.1 DAPS II/DAMS Interface. The DAPS II shall have 35 DAMS demodulator interfaces. The requirements for the DAPS II/DAMS interface are set forth in paragraph 2.5.1.1.
- 2.8.2 Test Transmitter Interfaces. The DAPS II shall have two Test Transmitter interfaces. The requirements for the DAPS II/Test Transmitter interface are set forth in paragraph 2.5.4 of these requirements.
- 2.8.3 Interrogate Modulator Interfaces. The DAPS II shall have two Interrogate Modulator control interface as defined in paragraph 2.5.2.2 of these requirements.
- 2.8.4 DCS Interrogate Control Equipment (DICE) Monitoring Interface. The DAPS II shall interface with the DCS Interrogate Control Equipment (DICE) monitoring port. The DICE replaces the Intermediate Frequency Presence Detector (IFPD) on the current DAPS. The requirements to accomplish this interface are provided in Attachment J-4.

- 2.8.5 DAPS II Intranet Communications. DAPS II shall provide a communications intranet network link from Wallops to Suitland. Dedicated T-1 communication circuits will be provided as Government Furnished Equipment (GFE) to support this requirement. Any necessary terminal connections, modems, hardware multiplexing or software to implement this intranet shall be provided as part of the DAPS II. The DAPS II shall also provide alarms and automatic fail over to the redundant T-1 should the primary T-1 circuit fail.
- 2.8.6 DAPS II User Data Dissemination Interfaces. The DAPS II shall support the following User DCS data dissemination circuits:
- 2.8.6.1 DOMSAT Broadcast Circuit. The DAPS II to DOMSAT interface shall output all DCP message data to the in place GFE DOMSAT broadcast circuit. This connection to the DOMSAT is adjacent to the DAMS racks at the Wallops facility. At the same location an interface port is available for use to input data for the Data Quality Monitor (DQM) to receive the uplinked data for DOMSAT quality control. The characteristics physical, electrical, and DOMSAT data format structure are set forth in Section J-4.
 - 2.8.6.2 Dedicated NWSGT Circuit. The DAPS II protocol and data formatting requirements are set forth in Attachment J-4 of this document. The NWSGT (formerly NMC) data circuit interconnects to a dedicated telephone or a backup switched telephone modem. This modem now operates at a 9,600 bps data rate.
 - 2.8.6.3 Asynchronous Dial-in Circuits. The DAPS II shall support up to ten (10) GFE asynchronous telephone circuits simultaneously at the Wallops facility. These circuits enable DCS users to review and update the DAPS II database, retrieve DCP message data, and use selected DAPS II reporting utilities.
 - 2.8.6.3.1 The DAPS II shall provide ten (10) 56 kbps asynchronous modems with MNP level 5 or equivalent error checking to interconnect to the in place switched telephone circuits. These modems shall be commercially available, offer automatic answering, and have the capability to detect and operate using multiple transmission rates up to and including 56 kbps.
 - 2.8.6.3.2 The DAPS II shall define this interface in terms of physical, electrical, and protocol specifications, and update and/or prepare appropriate documentation in the DAPS II User Interface Manual to enable DCS Users to effectively communicate with the DAPS II.
 - 2.8.6.4 Internet User DCS Interface. The DAPS II shall interface to the existing Internet Protocol (IP) addresses at Wallops and be capable of supporting Internet connections for up to five

hundred (500) simultaneous interactive users for push and pull access initially, expandable to accommodate all users

2.8.7 Wallops Timing System Interface. The DAPS II shall be interfaced to a NASA 36-bit format timing system signal @ 5 dBm into a 50 ohm coax TNC connector (see Attachment J-4). All DAPS II system component time shall be kept to within a 10 ms phase accuracy of that provided via the GFE NASA 36 time reference.

2.8.8 Channel Interference and Monitoring System (CIMS) Interface. The DAPS II shall have the capability to monitor all DCS channels for signal presence and capture the characteristics of any signals detected that are not scheduled by the database.

2.9 GOVERNMENT SYSTEM UTILITIES

The DAPS II shall provide utilities to assist the Government DCS Personnel in operating, monitoring, controlling, and administering the GOES DCS. These utilities shall be accessible via a Graphical User Interface (GUI). The GUI shall be COTS based, tailored to the DAPS II, and shall provide all of the functions performed by commands described in the Data Collection System Automatic Processing System Operator/Manager (O/M) Manual. This manual covers not only monitor, command and control functions, but also management reports that are generated by the DCS, either automatically or upon request. Beyond the DCS DAPS O/M Manual, the GUI shall also provide the features demonstrated by the current DAPS Internet web site, which may be accessed at <http://dcs.noaa.gov>. For example, the DAPS II shall provide the flexibility to link displays through the appropriate fields, such as from the channel schedule to the platform description table. Furthermore, any built-in DBMS commands, ad hoc queries, keyword searches, etc. which are available to the Government DCS Personnel shall be included as a subset of the DAPS II master command list. All of the DAPS II system utilities shall be made available to the DCS Users in a read-only mode via the asynchronous dial-in or Internet interfaces.

The DAPS II GUI shall be designed as the present user interface in that the command data sets shall apply to Government DCS Personnel and DCS Users in the same manner with the differences being system access privileges. Separate GUI screens for the Government DCS Personnel and DCS Users shall be provided with pull-down menus containing valid entries wherever possible. The following DBMS capabilities shall be provided by these utilities: database record entry, review and update; database string search and retrieval; historical tracking and recording of database modifications; and reporting and summarization of database record contents. DBMS functions shall be available in both interactive and batch modes. Batch updates shall be accomplished by queuing batches of data updates for later processing. Batch reports shall be generated when initiated or according to a schedule specified by the Government DCS Personnel and DCS Users. Capabilities shall be provided to permit both individual (one time only) and periodic (repeated at specified intervals, e.g. hourly, daily, weekly,

monthly, etc.) batch report scheduling. The Government DCS Personnel shall have the ability to override any DAPS II automated functions.

2.9.1 Government DCS Personnel Interface. Government DCS Personnel shall be able to review, modify, and print any part of any DAPS II database. They shall be able to call up to four real time displays simultaneously and be able to obtain a hardcopy print. They shall have the capability to run diagnostics tests on the DAPS II and all of its interfaces. Performance and utilization information shall be available to enable monitoring of specific DAPS II tasks, user activity, DCS channels, and error conditions. The Government shall have the capability to develop, test, modify, and exercise applications software without interfering with normal DAPS II operation. The Government DCS Personnel shall have the ability to initiate retransmission of data on the DOMSAT link, to recover from failed components, to provide manual component switch over, to review any part of DAPS II records, and to edit statistical products for errors. The Government DCS Personnel shall be able to compose and send messages to individual DCS users, a subset of DCS users and to the entire DCS user community via the DOMSAT link, asynchronous dial-in circuits, or the Internet and to receive messages from the DCS Users on the latter two interfaces.

2.9.1.1 Report Generation. The Government DCS Personnel shall be able to update, review, list (dump), and produce reports from all DAPS II databases, including trending analysis reports on platform and channel performance, both interactively and in batch mode (See para. 2.7).

2.9.1.2 Diagnostics. The Government DCS Personnel shall be able to run computer hardware/software system diagnostic testing on all system interfaces, both internal and external, without loss of data, real time performance, or functionality of the DAPS II. Tests are required for all DAPS II components and the following interfaces:

- DAMS Demodulator/Multiplexers - 100, 300 and 1200 bps.
- DCS Test Transmitters.
- DCS Interrogate Modulators.
- DICE Monitoring Interface.
- DROT DOMSAT Receiver.
- Data Quality Monitor (DQM) Communications Circuit.
- CDA Station Timing.
- DOMSAT Communications Circuit(s).
- NWSTG Communications Circuit(s).
- Asynchronous Dial-in Communications Circuits.
- Internet Communications Circuit(s).
- T-1 intranet network communications circuit(s)

A data link monitor (DLM) capability (such as currently provided using a Digilog digital protocol analyzer) shall be provided with the DAPS II for monitor and test of dial-in, network and other communications circuits.

- 2.9.1.3 DAMS Simulator. The DAMS message data simulator shall be capable of reproducing the DCP message data stream at one to three data rates, on a single channel, on a single chassis, on multiple chassis or under full systems load. The simulator shall be interfaced directly to the DAPS II.
- 2.9.1.4 DAPS II Software Development. A Government software specialist shall be able to develop, test, modify, and exercise DCS applications software, without loss of data or real time DAPS II functionality. Loss of these software modification related capabilities during system failures is acceptable. Modified software shall be copyable throughout the system without resort to off line media. All tools and documentation to maintain the applications software, COTS tools, etc., shall be provided as part of the DAPS II. The DAPS II shall provide the capability for developing and testing modifications and enhancements to the DAPS II software without affecting the continuous system availability, operations or performance.
- 2.9.1.5 Control of Test Transmitters (TTs). Government DCS Personnel shall be able to manually issue test transmissions or schedule test transmissions by time and channel, as specified in paragraph 2.5.4. The DAPS II shall inform the personnel if a manual or manually scheduled test transmission would interfere with scheduled messages from self-timed or interrogated DCPs, but the personnel shall have the capability to override that warning and proceed with the test. Government DCS Personnel shall be able to select the following: carrier with and without data; the duration of the blocking interval; and the message content for a given transmission. All scheduled and manual channel blocking shall be recorded in the DAPS II records.
- 2.9.1.6 Interrogations. The Government DCS Personnel shall be able to send interrogations and other commands to interrogate type DCPs, with no loss of data or realtime system functionality.
- 2.9.2 Administrative Utilities. The DAPS II shall provide administrative utilities with a user friendly interface for Government DCS Personnel to operate, manage, and maintain the system.
 - 2.9.2.1 DAPS II Database Utilities. The DAPS II shall contain utilities to review, create, and update each database description table record according to access privileges, interactively and in batch mode. The DAPS II shall have templates for creating new database records that show the new record, all data fields, the data structure and any nomenclature required for the field, etc.

- 2.9.2.2 DCP Address Generator. The DAPS II shall have a BCH DCP address generator that can review the existing entries in the DAPS II and generate a user address. The address and the applicable data fields from a user's UDT and/or MOA shall then be transferrable to the new PDT record to minimize manual data entry.
- 2.9.2.3 Channel Time Slot Assignment. The DAPS II shall include a utility to search for available channel time slots and display them for assignment to DCPs by Government DCS Personnel. The system shall provide tools to automatically assign time slots, either to an existing address or to an address generated by the address generator.
- 2.9.2.4 Data Entry Quality Assurance. The DAPS II shall assure quality control of entries and/or data field updates into the database records. An online Help function shall be provided to assist Government DCS Personnel with database operations, such as, by defining proper formats, units, syntax, etc. for data fields. When adding a new UDT record, the DAPS II shall have automatic address confirmation information sent to the new user by email with an interactive user confirmation required. When a new user is added, system allocation parameters, such as working directory, login ID and passwords, and space allocations shall be performed automatically.
- 2.9.2.5 The DAPS II shall automatically track all user requests that come in to the system, or that are entered manually by Government DCS Personnel, to ensure that all actions are completed. DAPS II shall notify Government DCS Personnel or DCS Users when an action is required. In addition, DCS Users shall be able to acquire information from the system concerning the status of their requests. The DAPS II shall generate and maintain statistics on performance of the user system interfaces, timeliness and completeness of response to users, user compliance to allocations or to system requirements. The DAPS II shall generate up to 10 reports to be defined by Government DCS Personnel from these statistics on a demand basis or on a prescheduled basis. The DAPS II shall provide the capability for the Government DCS Personnel or DCS Users to create ad hoc reports, dependent upon system access privilege (See paragraph 2.7).
- 2.9.3 Electronic Mail (email) Utility. The DAPS II shall provide the capability for Government DCS Personnel and DCS Users to compose and send electronic messages, for example, to a particular DCS User or to all users of a given DCP. The DAPS II shall have an electronic mail utility to send messages to Government DCS Personnel or DCS Users, similar to the current DAPS. This capability shall extend to the Internet interface via an email function. Automatic email notifications shall be sent to Government DCS Personnel and DCS Users by the DAPS II when triggered by certain DCS events, including the following: modifications made to database records, reminders of pending expirations of DCS User MOAs, periodic notices to update DCP point of contact information, and incomplete PDT record information. In addition, email shall be sent automatically to verify user address, telephone, and email information.

Confirmation by the user shall be required. All email traffic shall be monitored for successful delivery.

2.9.4 DCP Look Angle Utility. The DAPS II shall provide a web-based utility to assist DCS Users in deploying DCPs by computing elevation and pointing angles for antennas, given the GOES spacecraft assignment and the latitude, longitude, and minimum elevation angle of the platform. The DCS User will enter the Lat/Long and PDT address for this platform location and the system shall give the look angle for that location. This utility shall offer the same features as that provided by the current DAPS. (See Operator/Manager Manual paragraph 5.1.1) This function shall also check the DCP's database entries to compare locations and query the user whether the DCP location, or other parameter for the entries should be updated. This utility shall be available to Government DCS Personnel and to the DCS Users on the asynchronous dial-in and the Internet interfaces.

2.10 DCS USER INTERFACES

The DAPS II shall have four DCS User interfaces - the DOMSAT, the NWSATG telecom circuit(s), the asynchronous dial-in telephone circuits, and the Internet. In general most DCS Users will receive their DCP message data through the DOMSAT and NWSATG. All DCS Users shall be able to retrieve their DCP messages via the asynchronous dial-in circuits or the Internet. The asynchronous dial-in circuits and the Internet circuits enable the DCS Users not only to receive DCP message data, but also to review and modify the contents of their records in the DAPS II PDT, UDT, and MOA database files and to access selected DAPS II system utilities. The Internet connection shall provide the same functions as the asynchronous dial-in circuit; however, additional web functions may be provided. It is acceptable to provide a web interface that utilizes form entries. Note that some functions may be restricted according to access privileges of the user. Access privileges to system utilities by DCS Users shall be determined by the Government DCS Personnel.

Note that it is assumed the asynchronous dial-in DCS Users will have access to the DAPS II using a COTS browser with GUI similar in appearance and function to the Internet connection interface, with a text-only version provided for backward compatibility.

2.10.1 DOMSAT Broadcast Circuit. The DAPS II shall disseminate and/or broadcast all DCP message data and DAPS II generated error messages, bulletins and email via the DOMSAT interface:

2.10.1.1 DCP message data shall be in the same format as that of the DAPS and use the same protocols and error correction mechanisms described in Attachment J-4 to this document. Each message shall include a 16 bit sequence number, which shall be incremented by one for each message transmitted and recycled to zero at overflow.

- 2.10.1.2 The DAPS II DOMSAT link shall broadcast DCP message data in real time. Each message shall be assigned a transmission sequence number by the DAPS II to be used for comparison by the data quality monitoring software upon receipt at the WCDAS DQM.
- 2.10.1.2.1 If the DOMSAT communications medium is available, the DCP data messages and DAPS II generated messages shall be broadcast and stored within three (3) seconds after being received. Buffer memory, disk storage, and processing capabilities to meet this requirement shall be sized, provided, and integrated.
- 2.10.1.2.2 When the DOMSAT medium is not available (due to failure of the DOMSAT, its supporting facilities, or its communications link), or when the DOMSAT data quality monitor is reporting errors, the affected messages shall be logically queued for retransmission using the Message Retransmission Process described below. Retransmitted messages shall be identical to their original counterparts with the exception of the message sequence number. The sequence number shall be consistent with the placement of the retransmitted message in the DOMSAT retransmission queue.
- 2.10.1.3 DOMSAT Retransmission. DCS Users that normally receive DCP messages from the DOMSAT shall have the capability to request and receive retransmissions of messages that are lost due to environmental conditions or system failures of any kind. All DOMSAT retransmission requests, either via manual or automatic request, shall be recorded and made available for recall in the form of a report.
- 2.10.1.3.1 DCS Users shall make their retransmission requests directly via asynchronous dial-in or Internet interface.
- 2.10.1.3.2 DCS Users shall be able to request retransmission of all message data storage entries from DCPs listed in their UNL. If requests are made through the interactive mail utility, a user may specify a subset of their UNL.
- 2.10.1.3.3 Retransmission requests will be for specified time intervals, from one user specified date/time to another date/time.
- 2.10.1.3.4 DAPS shall contain the following two thresholds that would inhibit the automatic retransmission via DOMSAT if a DCS User exceeds the following:
- A. A preset number of retransmission requests per day.
 - B. A maximum number of DCP messages retransmitted in a given day.

- 2.10.1.4 DOMSAT Retransmit Queue (RQ). The DAPS II shall maintain and process a Retransmit Queue (RQ) of previously received DCP messages that either were not disseminated due to a DOMSAT related failure or were requested to be retransmitted.
- 2.10.1.4.1 The RQ, as implemented, is not required to contain the actual messages to be transmitted; rather, it may be a prioritized list of pointers to those messages.
- 2.10.1.4.2 Messages from the RQ shall be merged and transmitted with the real time DCP messages according to these priorities:
- A. All current DCP messages, ready for transmission, shall be sent.
 - B. If no current DCP message is ready, the oldest message in the RQ resulting from a general DOMSAT related failure shall be transmitted.
 - C. If neither of the above types of message are ready for transmission, messages in the RQ from the oldest user retransmission request shall be transmitted in chronological order.
- 2.10.1.4.3 If multiple failures and/or retransmission requests would result in a given message appearing more than once at a given time in the RQ, that message shall be queued only once and given the highest of the priorities it would otherwise have been assigned. Note that this does not preclude an additional retransmission request after a message has been previously retransmitted.

2.10.2 NWSTG Dissemination Circuit. The DAPS II shall interface to the GFE modem(s). The DAPS II shall transmit all messages from DCPs, bulletins and electronic mail to the NWS through its Telecommunications Gateway (TG). The NWSTG circuit contains special NWS WMO headers that shall be supplied by the DAPS II. A utility function shall be provided to automatically insert the location code into the WMO header. Filtering shall be provided to allow only selected items to be transmitted, as listed, to the NWSTG.

Note that the current NWSTG netlist differs from other DAPS II User network lists in that it contains approximately 99% of the total DCS or DOMSAT link message data load, while 100% of the message data is available.

- 2.10.2.1 The messages shall be transmitted over a dedicated communications link to the NWSTG using the protocols and error correction mechanisms described in Attachment J-4.
- 2.10.2.2 The messages shall be transmitted in near real time, subject to the availability of the link and of NWSTG communications facilities. The following two requirements apply:

- A. DCP messages shall be formatted and transmitted to the telecommunications gateway within five (5) seconds after being processed by DAPS II.
- B. The DAPS II shall be able to detect a NWSTG communications circuit failure and shall resume message data transmission at the point of interruption.

2.10.3 Dial-in Asynchronous Circuits. The DAPS II shall provide interactive access to the DCS Users through ten (10) asynchronous dial-in modem circuits at the WCDAS DAPS II facility. An additional line shall be provided for use by Government DCS Personnel. The three primary functions of this interface are for retrieval of DCP message data, review and/or edit of PDT, UDT, or MOA database records, and the use of DAPS II utilities for retrieval of reports and other system features. DCS User access to the DAPS II DBMS shall be limited to performing specific permitted functions and no access to view or modify DCS system software shall be permitted. Dial-in circuits shall be available to Government DCS Personnel and DCS Users.

- 2.10.3.1 The DAPS II shall provide interactive access to all DCS Users to perform the following administrative functions related to the DCPs under their control and to their overall use of the DCS:
 - 2.10.3.1.1 By using an inquiry capability, users shall be able to review all database records to which they are provided access.
 - 2.10.3.1.2 DCP Owners shall be able to update their database fields.
 - 2.10.3.1.3 All DCS Users shall be able to retrieve general status, summary, and statistical reports on platform and channel performance of similar type to those available to the Government DCS Personnel. However, DCS Users shall not be able to obtain any information of a confidential nature involving other DCS Users.
 - 2.10.3.1.4 The DAPS II shall automatically interrogate a user's DCP by receipt of a suitably formatted request message from a DCS User. The response time for a user requested interrogation shall be as soon as possible given other pending interrogations on the channel. The DAPS II format shall be used as a guide.
 - 2.10.3.1.5 The DAPS II shall be able to send manually generated interrogate and command messages from Government DCS Personnel and DCS Users to the interrogate modulators. The interrogate format is defined in the DCS "User Interface Manual". The response time for a user requested interrogation shall be as soon as possible given other pending interrogations on the channel.

- 2.10.3.2 DCS Users shall be able, via the asynchronous circuits, to retrieve messages from the DAPS II. The DAPS II should provide access to this utility via the user's primary message dissemination medium designation.
- 2.10.3.2.1 The message retrieval utility shall be provided automatically, without operator intervention, to enable users to retrieve all message storage entries from DCPs listed in their Network List, by creating a User DCS specified subset thereof, or by specifying a single valid DCP for a specified time interval, which may take any of the following forms, at user option:
- A. From last Network retrieval date/time to present.
 - B. From last Network retrieval date/time to user-specified date/time.
 - C. From user-specified date/time to present.
 - D. From one user-specified date/time to another date/time.
- 2.10.3.2.2 At the end of the retrieval process, the DAPS II shall record the event in the systems log and the message retrieval facility shall query the DCS User and shall, at user option, update the Network date/time entries for the last message disseminated for each DCP for which messages were retrieved.
- 2.10.3.3 DCS Users using the asynchronous dial-in circuit shall gain access to the DAPS II by entering their User ID and a password. The password shall be unique to the respective User ID and shall be eight minimum and fifteen maximum alphabetic characters in length. DCS Users shall be able to change their password as is done in the present DAPS (See DCS User Interface Manual).
- 2.10.4 DAPS II Internet Circuit. The DAPS II shall provide an Internet interface with tools to modify and expand this interface. This interface shall be available to Government DCS Personnel and DCS Users. The DAPS II Internet interface shall support all of the mission requirements of the present Internet interface available at <http://dcs.noaa.gov> and all of the features/functions provided by the DAPS asynchronous dial-in interface (See DCS User Interface Manual). DCS Users shall have access to the DAPS II through the Internet using a COTS web browser and any associated software necessary to perform the interface functions shall be available to the users via a free software download. The DAPS II shall provide DCS Users with the capability to submit MOA, PDT, UDT, etc., changes through a web interface. This interface shall confirm whether such submission is complete. Other requirements for the Internet interface are identified below.

- 2.10.4.1 General. Security and access control measures shall be provided such that Government DCS Personnel can perform management and software related functions at locations other than the dedicated workstations. This would include the ability to execute system utilities and monitor system performance. All DCS User message data and database tables shall be available through the Internet. There shall be several access methods to connect to and access the system, including Telnet, File Transfer Protocol (FTP), major COTS web browsers, and a GUI to the online DBMS, to include “pop-down” menus. Any necessary application for DCS Users to interface with the DAPS II using a COTS web browser shall be available via free download. In addition to basic DCP data dissemination, the system shall provide utilities to be used for troubleshooting DCS User problems, provide database query and update capabilities, and overall system access.
- 2.10.4.1.1 All Internet Protocol (IP) addresses and/or nodes on the DCS network, including Government DCS Personnel and DCS Users, shall have access to the DCP message data and the system database tables. Database modifications shall be executed either through a TELNET interface, similar to the present DAPS dial-in interface, or through the GUI that is to be developed and integrated into the DAPS II system.
- 2.10.4.1.2 The DAPS II shall be capable of supporting Internet connections for up to five hundred (500) simultaneous interactive users for push and pull access initially, expandable to accommodate all users. The DAPS II shall maintain records and logs to enable displays and reports to be generated to indicate the level of Internet activity.
- 2.10.4.2 Internet Interface Security. The primary goal of DAPS II security shall be the prevention of intrusion of unauthorized traffic. This shall include the prevention of unauthorized downloads to DAPS, the prevention of the usage of the DAPS web facilities as a “jumping off” point to other sites. It is acceptable to have an unprotected web site which will serve as a public web site. However, access to DAPS II and its message files, databases, etc. shall be protected. Internet access to the DAPS II shall be protected either through the use of firewalls, or other secured methods. Current encryption techniques may be utilized; however, all security measures shall be provided without direct impact on the DCS User community, i.e. no additional hardware or software required to be purchased. These security measures shall conform with Presidential Directive PPD6, “Protecting America’s Critical Infrastructure”, which is available online at <http://www.infosec.com/ciao/63factsheet.html> and “Management of Federal Information Resources” OMB Circular No. A-130, available at <http://www.whitehouse.gov/OMB> and any subsequent updates that are intended as replacements for these documents.
- 2.10.4.2.1 Computer virus scanning capability shall be integrated with the DAPS II. Any traffic routed to DAPS II via FTP or other modes shall be virus checked.

- 2.10.4.2.2 If firewall technology is provided, the Government DCS Personnel and DCS Users shall directly access the DAPS II through the security firewall by the following two methods:
- A. The firewall software shall recognize the incoming IP address, compare the address to a table and accept or reject the request. Users shall be allowed to have five (5) IP addresses to specify different workstation locations.
 - B. The firewall software shall accept a unique user name and password to gain access through the firewall for DCS Users who subscribe to the Internet via a block of addresses, or do not consistently use the same workstation location for system access.
- 2.10.4.2.3 Any changes in the security rules, such as firewall updates, encryption changes, etc., shall be reflected to all other nodes on the DAPS II intranet network. This update must be accomplished within three (3) seconds.
- 2.10.4.2.4 Security shall be provided through an Access Control List, which may be modified by Government DCS Personnel.
- 2.10.4.2.5 Any modifications to the security functions, such as, Access Control List, firewall rules, etc., shall be reflected in the system log. Affected DCS Users shall be notified by email.
- 2.10.4.2.6 The security controls, including but not limited to the security rules table, shall be backed up automatically on an hourly basis. This shall be a “rolling” backup where the five (5) previous copies shall be maintained on the system. These files shall have the current date/time as part of the file name.
- 2.10.4.3 Internet Access Modes. The DAPS II shall have the following three (3) Internet user access modes: Pull mode using Telnet or any major COTS web browser, Push mode, and FTP mode for file transfer.
- 2.10.4.3.1 Pull Mode. DCS Users shall be able to retrieve all DCP message data via the Internet, update DBMS records, submit FTP scripts, batch requests and retrieve reports via the Pull mode. All capabilities for data retrieval shall be provided for the Pull mode in a similar manner to the asynchronous dial-in circuit requirements (See paragraph 2.10.3).
 - 2.10.4.3.2 Push Mode. The DAPS II shall disseminate all DCP message data in direct broadcast fashion and in near real time to DCS Users via the Internet Push mode. All capabilities for broadcast of message data and retransmission, bulletins, error messages, and

system-wide email shall be provided in a similar manner to the DOMSAT broadcast circuit (See paragraph 2.10.1). This shall be “one way” where the user logs into DAPS II and waits for the retrieval of new data.

- 2.10.4.3.3 FTP Mode. The DAPS II shall provide each DCS user with a working directory space of five (5) MB each, with a total of fifty (50) GB of storage dedicated for DCS User FTP work space. A utility shall be provided to allocate each user’s FTP work space on the DAPS II. The FTP script(s) shall be generated and loaded on the DAPS II via the Pull mode or the asynchronous dial interface and executed at the user-script specified time. Up to ten (10) general purpose script templates shall be provided by DAPS II for editing and processing interactively by DCS Users. Other utilities that shall be provided to allocate and manage the DAPS II FTP mode include the following:
- A. Any data generated through the above methods shall be available to the requestor via the FTP utilities. The files generated by the system will include the date/time group in the naming convention. There will be the capability to move the files individually or as an attachment to an email message. Security shall be employed for all FTP activity according to the requirements in paragraph 2.10.4.2.
 - B. Each DCS User shall be allocated dedicated storage space on the DAPS II used to maintain scripts and files that are transmitted via FTP. The user shall have privileges to delete files from this directory (only).
 - C. Each DCS User shall be provided with utilities to manage and delete files from their workspace directories. The system shall record in the system log when files have been deleted from the system. When their workspace is full to within 10% of its capacity, an email notification shall be sent to the owner of the directory.
 - D. Government DCS Personnel shall have the capability to increase and decrease the allocated storage space designated to the DCS Users. DCS Users will not have this privilege. However, when this DCS User storage space has been modified, the user shall be notified and a notation placed in the system log. This function shall be available on an individual basis or through a global application.
 - E. the requested FTP transmission times shall be part of the database tables and are modifiable by Government DCS Personnel or DCS Users.

2.11 PHYSICAL REQUIREMENTS

The DAPS II shall be located in two (2) NOAA operational facilities. Each facility shall be equipped with five (5) work station operating positions with associated printers. Any DAPS II rack mounted equipment shall be installed in the GOES area of WCDAS.

2.11.1 Cabling. Inter-site and intra-site cabling at WCDAS to connect the DAPS II computer system, inclusive of all workstations at both Government locations, shall be included in the installation of the DAPS II. All cabling shall be in accordance with NOAA NESDIS Standard S24.803 attached in Attachment J-4.

All underfloor and overhead cabling and connections necessary to install DAPS II equipment at the Suitland site, as specified by the DAPS II Contractor, will be provided and installed by the Government due to accessibility restrictions in FOB#4.

2.11.2 Workstations. The Government DCS Personnel workstations shall be identically configured at each DAPS II location. Each shall include the following:

2.11.2.1 Sound cards to permit audible alarms to sound at the workstation.

2.11.2.2 An individual black and white 600 dpi laser printer and a networked color laser printer compatible with the DAPS II, suitable for an office environment, and capable of printing at least four pages per minute. The printers must be capable of printing directly from the DAPS II and from the workstation CRT screens. Additionally, a line printer shall be provided at each DAPS II location.

2.11.3 Rack Requirements DAPS II computer hardware and components thereof which are suitable for rack mounting shall be mounted in standard 19" wide racks. The requirements for computer racks are set forth in NOAA NESDIS standard S24.802 paragraph 3.5.

2.11.3.1 A DAPS II telephone shall be provided that is compatible with the existing WCDAS facility telephone system. A telephone jack in the GOES DCS computer area will be provided as GFE.

2.11.3.2 For each rack a fifteen (15) inch deep slide table surface shall be included as a "pull out", at a height of approximately 30 inches above the floor.

3.0 DOCUMENTATION

All DAPS II Operations and Maintenance (O&M) Manuals shall be provided in accordance with NESDIS Standard S24. 801, revised June 1999. All DAPS II manuals shall be provided in electronic format on CD-ROM with identical paper copies typewritten on A-4 or 8-1/2" X 11" paper, single sided with foldouts as required. The manuals on CD-ROM shall be delivered using a word processor format which is compatible with the latest version of Corel® WordPerfect. Graphics and figures too complex for presentation in word processor format shall be presented in Acrobat, GIF, JPEG or other format that can be viewed with software which is provided to the Government at no cost. The paper copies shall be presented in separate loose leaf binders which can be easily opened and closed, one for each manual. Online tutorials and help files shall be provided on the system in a printable format, such as Corel® WordPerfect or Adobe® Acrobat.

3.1 SYSTEMS OPERATIONS AND MAINTENANCE MANUALS

A DAPS II System Operations and Maintenance (O&M) manual shall be provided for all DAPS II systems hardware. One (1) paper copy and five (5) electronic copies on CD-ROM of the draft manual shall be provided at the time of DAPS II installation and integration testing for DAPS II training per paragraph 4.1. The Government shall have two (2) months to review these documents and provide comments. All Government comments shall be incorporated into the final documents. Two (2) paper copies and two (2) electronic copies on CD-ROM of the final system O&M manuals shall be provided prior to the end of DAPS II phase-in transition. An Appendix of this O&M manual shall include the wiring and/or cabling of the DAPS II into the GOES DCS at each site.

3.2 GOVERNMENT DCS PERSONNEL O&M MANUAL

A DAPS II Government DCS Personnel Operations and Maintenance (O&M) Manual shall be provided similar in type and content to that of the present DAPS (see Attachment J-4). Two (2) paper copies and five (5) electronic copies on CD-ROM of draft manuals shall be provided at the time of DAPS II installation and integration. The Government shall have two (2) months to review these documents and provide comments. All Government comments shall be incorporated into the final documents. Six (6) copies and one electronic copy of the final O&M manuals shall be provided prior to the end of DAPS II phase-in transition.

3.3 USER INTERFACE MANUAL

A DAPS II User Interface Manual (UIM) shall be provided similar in type and content to that of the present DAPS (see Attachment J-4) and serve as the present manual's replacement. One (1) paper copy and one (1) electronic copy on CD-ROM of the draft version of this new UIM is due during preliminary systems acceptance. The Government shall have a two (2) month review and comment period. All Government comments shall be incorporated into the final documents. One (1) camera

ready reproducible paper copy and fifty (50) electronic copies on CD-ROM of the DAPS II UIM shall be provided.

3.4 COTS MANUALS

Four (4) copies of all commercially available COTS manuals shall be provided for each unique item of COTS hardware and software used for the DAPS II, including, but not limited to, computer hardware, software, interfaces, peripherals, workstation, O&M manuals, computer system orientation and user manuals, software documentation, etc. For each of these items, an electronic copy on CD-ROM of the manual shall be provided if available from the original equipment manufacturer (OEM).

3.5 DAPS II SOFTWARE

Manuals shall be provided as defined in the following subsections and shall be written in accordance with NESDIS S24.801 and applicable FIPS Publication 38 as stated in the following subsections. All software used for DAPS II shall be covered in this documentation, except the commercially available software manuals discussed above in paragraph 3.4. Preliminary copies shall be provided to each student in the DAPS II training classroom lectures and labs.

3.5.1 Program Maintenance Manuals One (1) paper copy and one (1) electronic copy on CD-ROM of all program maintenance manuals shall be provided at the time of DAPS II preliminary acceptance. These manuals shall be documented to the level described in Attachment J-4, NESDIS Standard S24.806, Software Maintenance Documentation Standards.

3.5.2 Database Specifications Two (2) paper copies and two (2) electronic copies on CD-ROM of the DAPS II database documentation shall be provided. This includes all operator and system modifiable data areas in memory and/or stored in external disk or tape. The documentation shall be provided in draft form prior to acceptance testing. Final descriptions shall be provided two (2) months following preliminary acceptance. The data and file description must be in accordance with FIPS Publication 38, Sections 3.2 and 3.5.

3.5.3 Software Systems Maintenance Manual Two (2) paper copies and four (4) electronic copies on CD-ROM of the software systems maintenance manual shall be provided. This manual shall include descriptions of all DAPS II processes. The content of this manual shall contain detailed descriptions of all items listed in NESDIS Standard S24.806 for Software Systems User Documentation in Attachment J-4. Documentation of the computer Operating System, compilers, linkers, editors, assemblers, etc. used to develop the DAPS II software shall be provided.

3.6 SOURCE LISTING

Four (4) copies (listings) of all DAPS II specific software shall be provided in bound form. The initial copies shall be delivered thirty (30) days prior to preliminary Government acceptance. This source code shall be in accordance with the NESDIS S24.806 software development standards given in Attachment J-4. Listings of all code and data areas loaded into RAM or ROM of any DAPS II custom interfaces must be provided. Final listings shall be provided at preliminary acceptance.

4.0 INSTALLATION AND INTEGRATION

The DAPS II shall be delivered, installed and integrated into the GOES DCS area of the WCDAS and into the DCS management area in Wing 3 of FB-4. Six months prior to delivery, detailed site preparation requirements for power, air conditioning, floor space, etc. shall be provided to the COTR. Three months prior to delivery, a visit to each site shall be conducted to discuss the systems delivery, installation and integration with Government DCS Personnel.

4.1 INSTALLATION

Two (2) months prior to installation, an update to the site preparation requirements or an installation plan shall be submitted to the COTR, so that the DAPS II installation can be accomplished with minimum impact to WCDAS operations. While installing and checking out this equipment, it must be recognized that both facilities operate on a 24-hour, seven-days-a-week schedule. Therefore, all activities shall be coordinated with the NESDIS COTR and/or ACOTR.

4.2 CABLING

All inter and intra- system (signal and power) cabling necessary to install the DAPS II at the WCDAS shall be provided. This includes, but is not limited to cabling from existing GOES DCS Demodulators, NASA 36 station timing system, test transmitters, DICE computer monitoring and interrogate modulators, DQM DOMSAT monitor, AC power, and interconnection to the WCDAS grounding system per S24. 802. All DAPS II cabling shall be in accordance with NESDIS Standard No. S24.803, revised March 5, 1997 (see Attachment J-4). A maximum cabling length of 200 feet shall be assumed for all interconnections.

All underfloor and overhead cabling and connections necessary to install DAPS II equipment at the Suitland site, as specified by the DAPS II Contractor, will be provided and installed by the Government due to accessibility restrictions in FOB#4.

4.3 TOOLS AND EQUIPMENT

Tools, test equipment, and other necessary items for on-site installation, alignment, checkout, and testing shall be supplied as part of the DAPS II. Certain items, such as specialized test equipment and tools can be made available as GFE on a non-interference basis to NOAA operational programs. Use of such equipment shall be prearranged through the COTR and coordinated WCDAS management at time of use. Any special tools required to install the system shall be delivered as part of the DAPS II and left on-site at WCDAS. For example, a set of all crimping tools and their associated manuals, necessary for the proper construction and assembly of interface cables, shall be delivered to each site, and become Government property.

5.0 ADDITIONAL REQUIREMENTS

5.1 SPARE PARTS

A recommended spare parts list shall be provided in accordance with NESDIS Standard S24.805, revised January 24, 1990 (see Attachment J-4). This standard defines the level of spare parts required for all hardware provided for the project. Redundant subsystems contained within the DAPS II do not satisfy the requirement for spare parts.

5.2 SYSTEM DEVELOPMENT

5.2.1 Hardware. The DAPS II hardware shall be COTS. The use of non-COTS products and/or subassemblies shall be clearly defined in the systems hardware design. All DAPS II hardware shall be from proven suppliers, with at least a ten (10) year business profile. System components shall be "plug and play" and inclusive of systems diagnostics and/or test routines

5.2.2 Software Development Hardware. Any and all hardware needed for software development and support shall be provided with the DAPS II. The source code and listings of all DAPS II software shall be provided on a CD or tape in a system-compatible form, and all system developmental utilities (source editor, compilers, assemblers, etc.) used in developing the unique DAPS II software shall be provided. The DAPS II shall include a computer system performance monitor and a software configuration management function. This monitor shall show the processor loading, memory loading, Disk I/O, etc. for the DAPS II running in real time or under a DAPS II realtime simulation mode. The software configuration management function shall track all applications, commercial and custom, that make up the DAPS II by title, date and version number. Software licenses shall be provided for all DAPS II software and transferred to the Government at the time of preliminary systems acceptance.

5.2.3 Software Development. DAPS II shall be developed using an "open" systems architecture. The systems software shall be transferrable to alternate hardware platforms as higher performance systems and/or components becomes available. While COTS products are encouraged, any custom or "glueware" software or firmware shall be provided with its source code and documented in accordance with NESDIS standard S24.806. Also, for COTS software the number of copies and licensing of such and terms and agreements for the use of such shall be clearly identified.

At the time of preliminary acceptance, the DAPS II shall have the most recent release of the computer Operating System (OS) and all other commercial software. If a new release of any article of delivered commercial software occurs within two months prior to preliminary system acceptance, an earlier release may be delivered but the new release shall be integrated and

provided within two months after preliminary acceptance. All software applications necessary to develop and install DAPS II, and perform software maintenance, shall be provided, including but not limited to, compilers, languages, editors, linkers, etc.

5.3 EQUIPMENT COLORS

The DAPS II equipment shall be finished in colors in accordance with NESDIS standard S24.802, paragraph 3.13.3.

5.4 GOVERNMENT FURNISHED EQUIPMENT (GFE)

The Government will furnish a connection to download data from the following demodulator hardware of each type currently being used by the DCS to the Contractor for its use during the DAPS II design and development activities:

- A. 100 bps.
- B. 300 bps.
- C. 1200 bps.

At the Wallops CDA Station, the Government shall provide the following existing DAPS interfaces for use and systems testing:

- A. Connection to the DOMSAT interface.
- B. Connection to the NWSTG interface.
- C. Connection to ten (10) dial-in telecom circuits.
- D. Connection to the spare DICE unit. Cabling for use of the WCDAS antennas shall be provided as part of the DAPS II per paragraph 4.2.
- E. Nodal connections to the in-place Wallops Internet.
- F. Access to the monitoring ports of the existing cadre of GOES DCS Demodulators.
- G. A T-1 line with a redundant diversely routed backup between Wallops, VA and the Suitland, MD facilities. All communications hardware and software to make this circuit operational shall be provided as part of the DAPS II.

- H. Raised computer floor space with electrical power and AC for the new DAPS II at both locations.
- I. Existing DAPS test equipment can be made available for DAPS II installation on a non-interfering basis.
- J. A telephone jack in the GOES DCS computer area.

At the Suitland facility the Government shall provide the following existing DAPS interfaces for use and systems testing:

- A. Nodal connections to the in-place Suitland Direct Data Services Internet connection.
- B. The T-1 line between Suitland, MD and the Wallops, VA facilities. All communications hardware and software to make this circuit operational shall be provided as part of the DAPS II..
- C. Raised computer floor space with electrical power and air conditioning for the DAPS II workstations.

Cabling for all underfloor and overhead connections will be provided and installed by the Government due to the restricted accessibility in FOB#4, as specified by the Contractor in the DAPS II design.

GLOSSARY

Active

An active data collection platform is one that is reporting regularly as designed. Interrogate and Self-Timed platforms are considered active if they report at least once in every 48 hour period. A Random Reporting platform is considered active if it is considered active by its owner and has reported at least once. Platforms that are not active are called Deactive.

ALOHA

A packet-broadcasting technique whereby users transmit in a random fashion. If their transmissions are received with no errors detected, the transmission is assumed to be successful. If errors are detected, such as when packets interfere with each other, the packet(s) must be retransmitted after a random delay to avoid further interference.

Batch

The processing mode wherein a set of transactions (commands, database updates, report generation requests, data message retrieval, etc.) are submitted to the computer system for subsequent processing without further direct interaction with the submitter. In addition to the processing of the transactions, a log of actions taken and error conditions, if any, is normally produced and returned to the user after the processing is complete. Compare with Interactive.

BCH Code

Bose, Ray-Chaudhuri, and Hocquenghei code is the cyclic code used in data collection platform addresses to avoid mistakes in platform identification, and to improve the effective bit error rate and probability of undetected error. The BCH codes and addresses employed are described in NOAA Technical Memorandum NESS (NESDIS) 82, "The GOES Data Collection System Platform Address Code".

COTS Software

Software created, maintained and evolved by commercial industry for common needs across multiple organizations and domains, or any non-developmental item developed exclusively at private expense and competitively sold in substantial quantities to non-federal governments.

DCP Preamble

Long: 7.65s preceding start of data.

Short: 1.13s preceding start of data.

DCS Management Facility

The NESDIS facility responsible for management and administration of the DCS, located at the Suitland Federal Center, Federal Building #4 (FB-4), Suitland, Maryland.

DCS Users

The names of the organizational elements that use the Data Collection System. DCS Users may be Primary Users or Owners of data collection platforms, as well as Secondary Users. The names of DCS Users' higher organizational levels are entered as Parent Organizations and Major Organizations. Each user has an associated User ID.

Deactive

A deactive data collection platform is one that is not Active.

Dual

The normal reporting mode wherein the International data collection platforms transmit on channels 202 - 266, even only, via both GOES East and West.

Email

Electronic mail used routinely to transmit messages between the Government DCS Personnel and DCS Users, primarily for information dissemination and message retransmission requests.

Government DCS Personnel

The NESDIS personnel responsible for the management, operation and maintenance of the DCS, located at the NOAA facilities in Wallops, Virginia and Suitland, Maryland. They are responsible for the management and administration of the DCS; monitoring and operation of the DCS and DAPS II software, hardware and interfaces; response and appropriate corrective actions in the event of alarm condition; and repair and maintenance of the DCS.

Interactive

The processing mode wherein transactions (commands, database updates, report generation requests, etc.) are individually submitted to the computer system for immediate processing in response to prompts, by making selections from a menu, or by filling blanks in a form. Interactive processing normally is accomplished through a GUI browser and returns acknowledgments and error messages directly to the requester through that browser.

Interrogate

The reporting mode wherein the data collection platform reports only when a signal containing that platform's address is transmitted to the platform. The signal is called an interrogation. Compare with Random and Self-Timed modes.

Major Organization

The highest organizational level of a DCS User, for example, Department of the Interior.

Mirror

To maintain two data files that are identical in content and structure.

NWSTG

The National Weather Service Telecommunications Gateway is used in this context to indicate the communications switch which receives DCS input via one dedicated communications circuit from WCDAS, disseminating DCS data to the National Weather Service and other users.

Off-Line

A processor or other device that is not active in a systems' operation and not available for use by the system. Such a device may be in an idle condition or may be performing functions other than those specifically intended for its application in that system.

Online

A processor or other device that is actively performing or available to perform its intended functions within a system. This term is also used to indicate the interactive availability of system functions, such as, online help.

Owner

A Primary User of the DCS responsible for one or more data collection platforms. Owners are also DCS Users and, as such, have User IDs, Parent Organizations, and Major Organizations, also defined herein.

Parent Organization

The intermediate organizational level of a DCS user, for example, U.S. Geological Survey (USGS) is part of the Department of Interior and above the USGS field office users of the DCS.

Primary DCP Channel

The channel upon which a data collection platform transmits when in the mode given by its Primary DCP Type.

Primary DCP Type

The reporting mode (Interrogate, Self-Timed, or Random) normally employed by this data collection platform.

Primary User

The Owner of one or more data collection platforms.

Queue

A waiting list of events or tasks that are to be performed in a prescribed order.

Random Reporting

The reporting mode wherein the data collection platform reports at randomized times, often in response to sensor stimulus, e.g. when measurement thresholds are exceeded. Compare with Interrogate and Self-Timed modes.

Seasonal Indicator

A data collection platform attribute indicating that the platform is only functional during a particular season of the year.

Secondary DCP Channel

The channel upon which a data collection platform transmits when in the mode given by its PDT.

Secondary DCP Type

The reporting mode (Interrogate, Self-Timed, or Random) employed by this data collection platform in unusual circumstances, such as when measurement thresholds are exceeded.

Secondary User

A DCS User who retrieves message data from other owners' platforms.

Self-Timed

The reporting mode wherein the data collection platform reports according to a prescribed schedule. Compare with Interrogate and Random modes.

SHEF Codes

Two character codes which describe the DCP message data content. These codes enable users other than the platform owner to determine whether or not they desire to include a non-owned DCP in their User Network List for message data retrieval.

Transmission Window

The time interval during which Self-Timed data collection platform is scheduled to transmit a message to the DCS.

User ID

A short name by which all DCS Users are known by the DAPS. User IDs are eight characters or less in length and are normally recognizable abbreviations of the corresponding organizational element names.

User Network List

A list of DCP addresses specified by a DCS User for message data retrieval.

LIST OF ACRONYMS

ACOTR	Alternate Contracting Officer's Technical Representative
ANSI	American National Standard Institute
ASCII	American National Standard Code for Information Interchange
AST	Asynchronous Statistics Table
BCH	Bose, Ray-Chaudhuri, Hocquengheim
BER	Bit Error Rate
bps	Bits per second
BPSK	Binary Phase Shift Keying
CCT	Computer Compatible Tape
CDA	Command and Data Acquisition
CDT	Channel Description Table
CIMS	Channel Interference Monitoring System
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off The Shelf
CRC	Cyclic Redundancy Check
CST	Channel Statistics Table
D	Dual
DAMS	Data Acquisition and Monitoring System
DAPS	Data Collection System (DCS) Automated Processing Subsystem
DBMS	Data Base Management System
DCS	Data Collection System
DCP	Data Collection Platform
DCPI	Data Collection Platform Interrogation
DICE	DCS Interrogate and Control Equipment
DIM	DCS Interrogate Modulator
DLM	Data Line Monitor
DOC	Department of Commerce
DOMSAT	Domestic Communications Satellite
DROT	DOMSAT Receive Only Terminal
DQM	Data Quality Monitor
email	Electronic Mail
ETI	Event Triggered Identifier
FDM	Frequency Division Multiplexing
FIPS	Federal Information Processing Standards
FTP	File Transfer Protocol
GFE	Government Furnished Equipment
GFI	Government Furnished Information
GMT	Greenwich Mean Time

GOES	Geostationary Operational Environmental Satellite
GUI	Graphical User Interface
HDR	High Data Rate
I	Interrogate
ID	Identifier, Identification
IST	Internet Statistics Table
I/O	Input/Output
IP	Internet Protocol
LRU	Lowest Replaceable Unit
MB	Megabyte (Million 8-bit words)
MOA	Memorandum of Agreement
MST	Message Statistics Table
MTTR	Mean Time To Repair
NASA	National Aeronautics and Space Administration
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Standards and Technology
NMC	National Meteorological Center
NMP	Network Management Protocol
NST	NWSTG Statistics Table
NWS	National Weather Service
NWSTG	National Weather Service Telecommunications Gateway
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
OMB	Office of Management and Budget
OSD	Office of System Development
OSDPD	Office of Satellite Data Processing and Distribution
OSO	Office of Satellite Operations
PDT	Platform Description Table
PST	Platform Statistics Table
RDT	Radio Description Table
RF	Radio Frequency
R	Random Reporting
RQ	Retransmit Queue
s	Seconds
S	Self-Timed
S/C	Spacecraft
SCSI	Small Computer System Interface
SCT	System Configuration Table
SOL	System Outage Log

SHEF	Standard Hydrology Exchange Format
SHS	System Hardware Status
TG	Telecommunications Gateway
TNC	Threaded Navy Connector
TT	Test Transmitter
TTFL	Test Transmitter Failure Log
UDT	User Description Table
UIM	User Interface Manual
UNL	User Network List
UST	User Statistics Table
WCDAS	Wallops Command and Data Acquisition Station
WMO	World Meteorological Organization